

TOWER 1-28



Specifications
100' Mid Mount Tower Ladder
Rev8 09/8/2021

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RESTRICTIONS

Vehicle length restriction. A 43" OAL applies to the vehicle due to building restrictions.

APPROVAL DRAWING

A drawing of the proposed apparatus will be prepared and provided to the purchaser for approval before construction begins. The sales representative will also be provided with a copy of the same drawing. The finalized and approved drawing will become part of the contract documents. This drawing will indicate the chassis make and model, location of the lights, siren, horns, compartments, major components, etc.

A "revised" approval drawing of the apparatus will be prepared and submitted to the purchaser showing any changes made to the approval drawing.

ELECTRICAL WIRING DIAGRAMS

Two (2) electrical wiring diagrams, prepared for the model of chassis and body, will be provided.

CHASSIS

A (4) door custom apparatus chassis developed exclusively for the fire service. Chassis provided will be a new, tilt type custom fire apparatus. The chassis will be designed and manufactured for heavy duty service, with adequate strength, capacity for the intended load to be sustained, and the type of service required. The chassis will be the manufacturer's heavy duty line tilt cab.

WHEELBASE

The wheelbase of the vehicle shall not exceed 260.00 inches

GVW RATING

The gross vehicle weight shall not exceed 78,000 lb.

FRAME

The chassis frame will be built with two (2) steel channels bolted to five (5) cross members or more, depending on other options of the apparatus. The side rails will have a 13.38" tall web over the front and mid sections of the chassis, with a continuous smooth taper to 10.75" over the rear axle. Each rail will have a section modulus of 25.992 cubic inches and a resisting bending moment (rbm) of 3,119,040 in-lb over the critical regions of the frame assembly, with a section modulus of 18.96 cubic inches with an rbm of 2,275,200 in-lb over the rear axle. The frame rails will be constructed of 120,000 psi yield strength heat-treated 0.38" thick steel with 3.50" wide flanges. Frame and cross members shall be hot dipped galvanized.

FRAME REINFORCEMENT

In addition, a full-length mainframe internal "C" liner will be provided. The liner will be an internal "C" design that steps to a smaller internal "C" design over the rear axle. It will be heat-treated steel measuring 12.50" x 3.00" x 0.25" through the front "C" portion of the liner, stepping to 9.38" x 3.00" x 0.25" through the rear "C" portion of the liner. Each liner will have a section modulus of 13.58 cubic inches, yield strength of 110,000 psi, and rbm of 857,462 in-lb. Total rbm at wheelbase center will be 4,391,869 in-lb. The frame liner will be mounted inside of the chassis frame rail and extend the full length of the frame. Shall be hot dipped galvanized.

FRONT NON DRIVE AXLE

The front axle will be of the independent suspension design with a minimum ground rating of 24,000 lb. Upper and lower control arms will be used on each side of the axle. Upper control arm castings will be made of 100,000-psi yield strength 8630 steel and the lower control arm casting will be made of 55,000-psi yield ductile iron.

The center cross members and side plates will be constructed out of 80,000-psi yield strength steel. Each control arm will be mounted to the center section using elastomer bushings. These rubber bushings will rotate on low friction plain bearings and be lubricated for life. Each bushing will also have a flange end to absorb longitudinal impact loads, reducing noise and vibrations.

There will be nine (9) grease fittings supplied, one (1) on each control arm pivot and one (1) on the steering gear extension.

The upper control arm will be shorter than the lower arm so that wheel end geometry provides positive camber when deflected below rated load and negative camber above rated load.

Camber at load will be zero degrees for optimum tire life.

The ball joint bearing will be of low friction design and be maintenance free.

Toe links that are adjustable for alignment of the wheel to the center of the chassis will be provided.

The wheel ends must have little to no bump steer when the chassis encounters a hole or obstacle.

The steering linkage will provide proper steering angles for the inside and outside wheel, based on the vehicle wheelbase.

The axle will have a third party certified turning angle of 40 degrees. Front discharge, front suction, or aluminum wheels will not infringe on this cramp angle.

FRONT SUSPENSION

Independent suspension will be provided with a minimum ground rating of 24,000 lb.

The independent suspension system has been designed to provide maximum ride comfort. The design will allow the vehicle to travel at highway speeds over improved road surfaces and at moderate speeds over rough terrain with minimal transfer of road shock and vibration to the vehicle's crew compartment.

Each wheel will have a torsion bar type spring. In addition, each front wheel end will also have energy absorbing jounce bumpers to prevent bottoming of the suspension.

The suspension design will be such that there is at least 10.00" of total wheel travel and a minimum of 3.75" before suspension bottoms.

The torsion bar anchor lock system allows for simple lean adjustments, without the use of shims. One can adjust for a lean within 15 minutes per side. Anchor adjustment design is such that it allows for ride height adjustment on each side.

FRONT SHOCK ABSORBERS

Heavy-duty shock absorbers will be provided on the front suspension.

FRONT OIL SEALS

Oil seals with viewing window will be provided on the front axle.

FRONT TIRES

Front tires will be Goodyear radials 445/65R22.50, 20 ply all-position G296 **load range L** MSA tread, rated for 24,600 lb. maximum axle load and 68 mph maximum highway speed.

The tires will be mounted on Alcoa 22.50" x 13.00" polished aluminum disc type wheels with a ten (10)stud, 11.25" bolt circle.

FRONT HUB COVERS

Stainless steel hub covers will be provided on the front axle. An oil level viewing window will be provided.

REAR AXLE

The rear axle will be a Meritor™, Model RT-50-160, tandem axle assembly with a capacity of 52,000 lb. An inter-axle differential, which divides torque evenly between axles, will be provided with an indicator light mounted on the cab instrument panel.

TOP SPEED OF VEHICLE

A rear axle ratio will be furnished to allow the vehicle to reach a top speed of 68 mph in 6th gear highway speed. (See transmission shift language. 6th gear lockout)

SUSPENSION, REAR

Rear suspension will be Link® combination air ride and walking beam with a ground rating of 52,000 lb.

REAR OIL SEALS

Oil seals will be provided on the rear axle(s).

REAR TIRES

Rear tires will be eight (8) Goodyear 12R22.50 radials, 16 ply all season G622 RSD tread, rated for 54,240 lb maximum axle load and 75 mph maximum speed.

The tires will be mounted on Alcoa© 22.50" x 8.25" polished aluminum disc wheels with a ten (10) stud 11.25" bolt circle.

REAR HUB COVERS

Stainless steel, high hat, hub covers will be provided on the rear axle hubs.

TIRE BALANCE

All tires will be balanced with Counteract balancing beads. The beads will be inserted into the tire and eliminate the need for wheel weights.

CHROME LUG NUT COVERS

Chrome lug nut covers will be supplied on front and rear wheels.

TIRE PRESSURE MANAGEMENT

There will be a RealWheels LED AirSecure™ tire alert pressure management system provided, that will monitor each tire's pressure. A sensor will be provided on the valve stem of each tire for a total of 10 tires. The sensor will calibrate to the tire pressure when installed on the valve stem for pressures between 10 and 200 psi. The sensor will activate an integral battery operated LED when the pressure of that tire drops 5 to 8 psi.

Removing the cap from the sensor will indicate the functionality of the sensor and battery. If the sensor and battery are in working condition, the LED will immediately start to flash.

MUD FLAPS

Mud flaps will be installed behind the front and rear wheels.

WHEEL CHOCKS

There will be one (1) pair of folding Ziamatic, Model SAC-44-E, aluminum alloy, Quick-Choc wheel blocks, with easy-grip handle provided.

WHEEL CHOCK BRACKETS

There will be one (1) pair of Zico, Model SQCH-44-H, horizontal mounting wheel chock brackets provided for the Ziamatic, Model SAC-44-E, folding wheel chocks. The brackets will be made of aluminum and

consist of a quick release spring loaded rod to hold the wheel chocks in place. The brackets will be mounted rearward of the left side rear tire.

ANTI-LOCK BRAKE SYSTEM

The vehicle will be equipped with a Wabco 4S4M, anti-lock braking system. The ABS will provide a four (4) channel anti-lock braking control on both the front and rear wheels (rear tandem wheels). A digitally controlled system that utilizes microprocessor technology will control the anti-lock braking system. Each wheel will be monitored by the system. When any particular wheel begins to lockup, a signal will be sent to the control unit. This control unit then will reduce the braking of that wheel for a fraction of a second and then reapply the brake. This anti-lock brake system will eliminate the lockup of any wheel thus helping to prevent the apparatus from skidding out of control.

BRAKES

The service brake system will be full air type.

The front brakes will be Knorr/Bendix disc type with a 17.00" ventilated rotor for improved stopping distance.

The brake system will be certified, third party inspected, for improved stopping distance.

The rear brakes will be Meritor™ 16.50" x 7.00" cam operated with automatic slack adjusters. Dust shields will be provided.

AIR COMPRESSOR, BRAKE SYSTEM

The air compressor will be a Bendix®, Model BA-921, with 15.80 cubic feet per minute output at 1,250 rpm.

BRAKE SYSTEM

The brake system will include:

- Bendix dual brake treadle valve
- Heated automatic moisture ejector on air dryer
- Total air system capacity of 6,653 cubic inches
- Two (2) air pressure gauges with a red warning light and an audible alarm, that activates when air pressure falls below 60 psi
- Spring set parking brake system
- A parking "brake on" indicator light on instrument panel
- Park brake relay/inversion and anti-compounding valve, in conjunction with a double check valve system, will be provided with an automatic spring brake application at 40 psi
- A pressure protection valve to prevent all air operated accessories from drawing air from the air system when the system pressure drops below 80 psi (550 kPa)
- 1/4 turn drain valve on each air tank

PARKING BRAKE (* NOTE LOCATION REQUIREMENTS)

The parking brake shall be of the spring-actuated type, mounted on the rear axle brake chambers. The parking brake control and red application warning light will be mounted on the cab instrument panel. It shall be so located as to allow for application of the parking brake from both the driver's and officer's position.

THE AIR TANKS WILL BE POLISHED ALUMINUM.

To reduce the effects of corrosion, the air tanks will be mounted with stainless steel brackets.

BRAKE SYSTEM AIR DRYER

The air dryer will be WABCO System Saver 1200 with spin-on coalescing filter cartridge and 100 watt heater.

BRAKE LINES

Color-coded nylon brake lines will be provided. The lines will be wrapped in a heat protective loom in the chassis areas that are subject to excessive heat.

AIR INLET

One (1) air inlet with 3D series male coupling will be provided. It will allow station air to be supplied to the apparatus brake system through a shoreline hose. The inlet will be located forward in the driver side lower step well of cab. A check valve will be provided to prevent reverse flow of air. The inlet will discharge into the "wet" tank of the brake system. A mating female fitting will also be provided with the loose equipment.

ALL WHEEL LOCK-UP

An additional all wheel lock-up system will be installed which applies air to the front brakes only. The standard spring brake control valve system will be used for the rear. Interlock shall be provided to prevent activation while in motion.

ENGINE

The chassis will be powered by an electronically controlled engine as described below:

Make:	Detroit™
Model:	DD13®
Power:	525 hp at 1625 rpm
Torque:	1850 lb-ft at 1075 rpm
Governed Speed:	Full Load - 1900 rpm Road/2080 rpm Parked PTO
Emissions Certification:	EPA 2016 (GHG17)
Fuel:	Diesel
Cylinders:	Six (6)
Displacement:	781 cubic inches (12.8L)
Starter:	Delco Remy 39MT™
Fuel Filters:	Dual cartridge style with check valve, water separator, and water in fuel sensor

The engine will include On-board diagnostics (OBD), which provides self-diagnostic and reporting. The system will give the owner or repair technician access to state of health information for various vehicle sub systems. The system will monitor vehicle systems, engine and after treatment. The system will illuminate a malfunction indicator light on the dash console if a problem is detected.

HIGH IDLE

A high idle switch will be provided, inside the cab, on the instrument panel, that will automatically maintain a preset engine rpm. A switch will be installed, at the cab instrument panel, for activation/deactivation. The high idle will be operational only when the parking brake is on and the truck transmission is in neutral. A green indicator light will be provided, adjacent to the switch. The light will illuminate when the above conditions are met. The light will be labeled "OK to Engage High Idle."

ENGINE BRAKE

A Jacobs® engine brake is to be installed with the controls located on the instrument panel within easy reach of the driver.

The driver will be able to turn the engine brake system on/off and have a high, medium and low setting.

The engine brake will be installed in such a manner that when the engine brake is slowing the vehicle the brake lights are activated.

The ABS system will automatically disengage the auxiliary braking device when required.

CLUTCH FAN

A Horton® fan clutch will be provided. The fan clutch will be automatic when the pump transmission is in "Road" position, and fully engaged in "Pump" position.

ENGINE AIR INTAKE

The air intake with an ember separator will be mounted high on the passenger side of the cab, to the front of the crew cab door. The ember separator is designed to prevent road dirt and recirculating hot air from entering the engine. The ember separator will be easily accessible through a hinged stainless steel grille, with one (1) flush quarter turn latch.

EXHAUST SYSTEM

The exhaust system will include a diesel particulate filter (DPF) and a selective catalytic reduction (SCR) device to meet current EPA standards. The exhaust system will be stainless steel from the turbo to the inlet of the SCR device and will be 5.00" in diameter. An insulation wrap will be provided on all exhaust pipes between the turbo and SCR to minimize the transfer of heat to the cab. The exhaust will terminate horizontally ahead of the right side rear wheels. A tailpipe diffuser will be provided to reduce the temperature of the exhaust as it exits. Heat deflector shields will be provided to isolate chassis and body components from the heat of the tailpipe diffuser.

RADIATOR

The radiator and the complete cooling system will meet or exceed NFPA and engine manufacturer cooling system standards.

For maximum corrosion resistance and cooling performance, the entire radiator core will be constructed using long life aluminum alloy. The core will be made of aluminum fins, having a serpentine design, brazed to aluminum tubes. The tubes will be brazed to aluminum headers. The radiator core will have a minimum frontal area of approximately 1,352 square inches. Supply tank made of glass-reinforced nylon and a return tank of cast aluminum alloy will be crimped on to the core assembly using header tabs and a compression gasket to complete the radiator core assembly. The radiator will be compatible with commercial antifreeze solutions.

There will be a full steel frame around the entire radiator core assembly. The radiator core assembly will be isolated within the steel frame by rubber inserts to enhance cooling system durability and reliability. The radiator will be mounted in such a manner as to prevent the development of leaks caused by twisting or straining when the apparatus operates over uneven ground. The radiator assembly will be isolated from the chassis frame rails with rubber isolators.

The radiator assembly will include an integral de-aeration tank permanently mounted to the top of the radiator framework, with a readily accessible remote-mounted overflow tank. For visual coolant level inspection, the radiator will have a built-in sight glass. The radiator will be equipped with a 15 psi pressure relief cap.

A drain port will be located at the lowest point of the cooling system and/or the bottom of the radiator to permit complete flushing of the coolant from the system.

A heavy-duty fan will draw in fresh, cool air through the radiator. Shields or baffles will be provided to prevent recirculation of hot air to the inlet side of the radiator.

COOLANT LINES

Gates, or Goodyear, rubber hose will be used for all engine coolant lines.

Hose clamps will be stainless steel constant torque type to prevent coolant leakage.

FUEL TANK

A 65 gallon fuel tank will be provided and mounted at the rear of the chassis. The tank will be constructed of stainless steel. It will be equipped with swash partitions and a vent. The exterior of the tank will be painted to match the chassis frame. To reduce the effects of corrosion, the fuel tank will be mounted with stainless steel straps.

A 0.75" drain plug will be provided in a low point of the tank for drainage.

A fill inlet will be located on the left hand side of the body and be covered with a hinged, spring loaded, stainless steel door that is marked "Ultra Low Sulfur - Diesel Fuel Only".

A 0.50" diameter vent will be provided running from top of tank to just below fuel fill inlet.

The tank will meet all FHWA 393.67 requirements, including a fill capacity of 95 percent of tank volume.

All fuel lines will be provided as recommended by the engine manufacturer.

DIESEL EXHAUST FLUID TANK

A 4.5 gallon diesel exhaust fluid (DEF) tank will be provided and mounted in the driver's side body forward of the rear axle.

A 0.50" drain plug will be provided in a low point of the tank for drainage.

A fill inlet will be located on the driver's side of the body and be covered with a hinged, spring loaded, polished stainless steel door that is marked "Diesel Exhaust Fluid Only".

The tank will meet the engine manufacturers' requirement for 10 percent expansion space in the event of tank freezing.

The tank will include an integrated heater unit that utilizes engine coolant to thaw the DEF in the event of freezing.

FUEL COOLER

An air to fuel cooler will be installed in the engine fuel return line.

TRANSMISSION

An Allison 5th generation, Model EVS 4000P, electronic, torque converting, automatic transmission will be provided.

The transmission will be equipped with prognostics to monitor oil life, filter life, and transmission health. A wrench icon on the shift selector's digital display will indicate when service is due.

Two (2) PTO openings will be located on left side and top of converter housing (positions 8 o'clock and 1 o'clock).

A transmission temperature gauge with red light and buzzer will be installed on the cab instrument panel.

TRANSMISSION SHIFTER / MODE

The transmission shall be controlled by an Allison push button type shift control. It shall be internally illuminated for night operation. It shall be mounted to the right of the steering column on the driver's dash console. The transmission, upon start-up, shall select four-(5th) gear operation. By pressing the "mode" switch on the shift pad (mode on) provides five-(6th) gear (overdrive operation) for highway speeds

The transmission ratio will be:

1st	3.51 to 1.00
2nd	1.91 to 1.00
3rd	1.43 to 1.00
4th	1.00 to 1.00
5th	0.75 to 1.00
6th	0.64 to 1.00
<u>R</u>	<u>4.80 to 1.00</u>

TRANSMISSION COOLER

An externally mounted Modine bar plate transmission oil cooler will be provided using engine coolant to control the transmission oil temperature. The internal bar plates will be constructed of stainless steel. The cooler's housing will be constructed of 1020 steel, coated to protect from corrosion. The cooler will be tagged with information including OEM part number, vendor serial number and date / lot code.

DRIVELINE

Drivelines will be a heavy-duty metal tube and be equipped with Spicer® 1810 universal joints.

The shafts will be dynamically balanced before installation.

A splined slip joint will be provided in each driveshaft where the driveline design requires it. The slip joint will be coated with Glidecoat® or equivalent.

STEERING

Dual Sheppard, Model M110, steering gears, with integral heavy-duty power steering, will be provided. For reduced system temperatures, the power steering will incorporate an air to oil cooler and an Eaton, Model VN20, hydraulic pump with integral pressure and flow control. All power steering lines will have wire braded lines with crimped fittings.

A tilt and telescopic steering column will be provided to improve fit for a broader range of driver configurations.

STEERING WHEEL

The steering wheel will be 18.00" in diameter, have tilting and telescoping capabilities, and a 4-spoke design.

BUMPER

An aluminum bumper, minimum of 10.00" high will be attached to a bolted modular frame extension. The bumper will be extended 15.00" from front face of cab. The bumper will be metal finished and painted job color.

GRAVEL PAN

A gravel pan, constructed of bright aluminum treadplate, will be furnished between the bumper and cab face. The gravel pan will be properly supported from the underside to prevent flexing and vibration of the aluminum treadplate.

LIFT AND TOW MOUNTS

Mounted to the frame extension will be lift and tow mounts. The lift and tow mounts will be designed and positioned to adapt to certain tow truck lift systems.

The lift and tow mounts with eyes will be painted the same color as the frame.

TOW HOOKS

No tow hooks are to be provided. This truck will be equipped with a lift and tow package with integral tow eyes.

CAB

The cab and chassis will be designed for and manufactured specifically for use in the fire service and meet the requirements of the 2016 edition of **NFPA 1901** Standard.

The custom chassis shall be manufactured within the borders of the United States of America.

The bidder shall specify the manufacturer of the cab and chassis.

The cab shall be custom manufactured, medium four doors, full tilt, and aluminum construction, with a contour windshield.

The cab will be fully enclosed, capable of comfortably seating Six (6) fire fighters in full firefighting turnout gear. Cab will be of the cab over engine design, with integral tilt mechanism and engine access. Cab will be a mid-size M.F.D. four (4) -door designs, with four (4) side-opening doors. (No Exceptions) The cab interior will be the "Open-Space" design with no wall or window between the front and rear crew area to allow direct communication, better visibility and air circulation in the cab.

CAB ROOF DRIP RAIL

For enhanced protection from inclement weather, a drip rail will be furnished on the sides of the cab. The drip rail will be constructed of bright polished extruded aluminum, and be bonded to the sides of the cab. The drip rail will extend the full length of the cab roof.

INTERIOR CAB INSULATION

The cab will include 1.50" insulation in the ceiling and side walls, and 2.00" insulation in the rear wall to maximize acoustic absorption and thermal insulation.

FENDER LINERS

Full circular inner fender liners in the wheel wells will be provided.

WINDSHIELD

A curved safety glass windshield will be provided with over 2,754 square inches of clear viewing area. The cab windshield will have bright trim inserts in the rubber molding holding the glass in place. Economical windshield replacement glass will be readily available from local auto glass suppliers. All cab glass will be tinted.

WINDSHIELD WIPERS

Two (2) electric windshield wipers with washer will be provided that meet FMVSS and SAE requirements. The washer reservoir will be able to be filled without raising the cab.

GLOVE BOX

A glove box with a drop-down door will be installed in the front dash panel in front of the officer's position.

ENGINE TUNNEL

Engine hood side walls will be constructed of 0.50" aluminum. The top will be constructed of 0.19" aluminum and will be tapered at the top to allow for more driver and passenger elbow room. The engine hood will be insulated for protection from heat and sound. The noise insulation keeps the dBA level within the limits stated in the current NFPA 1901 standards.

CAB REAR WALL EXTERIOR COVERING

The exterior surface of the rear wall of the cab will be overlaid with bright aluminum treadplate except for areas that are not typically visible when the cab is lowered.

CAB LIFT

A hydraulic cab lift system will be provided consisting of an electric powered hydraulic pump, dual lift cylinders, and necessary hoses and valves. The hydraulic pump will have a manual override for backup in the event of electrical failure. Lift controls will be on a panel located on the right side pump panel or front area of the body in a convenient location. The engine will be easily accessible and capable of being removed with the cab tilted. The cab will be capable of tilting 45 degrees and 90 degrees with crane assist. Cab will be locked down by a 2-point automatic spring-loaded hook mechanism that actuates after the cab has been lowered.

The hydraulic cylinders will be equipped with a velocity fuse that protects the cab from accidentally descending when the control is located in the tilt position.

For increased safety, a redundant mechanical stay arm will be provided that must be manually put in place on the driver side between the chassis and cab frame when the cab is in the raised position. This device will be manually stowed to its original position before the cab can be lowered.

CAB LIFT INTERLOCK

The cab lift system will be interlocked to the parking brake. The cab tilt mechanism will be active only when the parking brake is set and the ignition switch is in the on position. If the parking brake is released, the cab tilt mechanism will be disabled.

The cab lift safety system will also be interlocked to the front stabilizers in the bumper. The cab tilt mechanism will be active only when the front stabilizers are fully stowed, and fully tilted outboard. The cab tilt mechanism will not allow the front stabilizers to be tilted inboard until the cab has been fully lowered and locked into position.

GRILLE

A bright finished aluminum mesh grille screen, inserted behind a bright finished grille surround, will be provided on the front center of the cab.

DOOR JAMB SCUFFPLATES

All cab door jambs will be furnished with a polished stainless steel scuffplate, mounted on the striker side of the jamb.

SIDE OF CAB MOLDING

Chrome molding will be provided on both sides of cab.

MIRRORS

A Retractable, Model 613423, dual vision, motorized, west coast style mirror, with chrome finish, will be mounted on each side of the front cab door with spring loaded retractable arms. The flat glass and convex glass will be heated and adjustable with remote control within reach of the driver.

FRONT CROSS VIEW MIRROR

An 8.00" diameter round convex mirror will be provided over the officer's side front corner of the cab. The mirror will provide the driver with a view of the front bumper and the area several feet in front of the truck. The mirror housing, tubing, clamps, and hardware will be constructed of corrosion resistant stainless steel. The mirror will be heated with the control inside the cab.

DOORS (BARRIER TYPE)

Provide four (4) side-opening doors. The cab doors shall be totally aluminum construction with an extruded aluminum frame and a 3/16" aluminum door skin. Doors will be barrier height from the top of the exposed step to the cab roof rain gutter. The doors shall provide approximately 32 inches of clearance from the ground to the bottom of the door so the cab doors may open unhindered. The forward cab door opening will be a minimum of 37" wide, and the rear cab door opening will be a minimum of 33" wide. The rearward cab doors will have a radius cutout allowing the door opening to protrude forward over the cab wheel well, while providing full access to the rear crew area.

Provide each side cab door with a fully retractable window operated by an electrical mechanism.

The doors shall close flush with the side of the cab. Provide heavy duty 6" wide belting material to prevent the cab doors from opening greater than 90 degrees. Provide two (2) large Aluminum grab handles on the interior of each cab door, positioned to assist cab entry/egress and closing of the door.

DOOR PANELS

There will be a full height brushed stainless steel door panel installed on the inside of all cab doors. The cab door panels will be removable without disconnecting door and window mechanisms.

CAB DOOR WINDOWS ELECTRIC OPERATED

All four (4) cab doors shall be equipped with electric operated windows with one (1) flush mounted automotive style switch on each door. The driver's door shall have four (4) switches, one (1) to control each door window.

Each switch shall allow intermittent or auto down operation for ease of use. Auto down operation shall be actuated by holding the window down switch for approximately 1 second.

CAB STEPS

The forward cab and crew cab access steps will be a full size two (2) step design to provide largest possible stepping surfaces for safe ingress and egress. The bottom steps will be designed with a grip pattern punched into bright aluminum treadplate material to provide support, slip resistance, and drainage. The bottom steps will be a bolt-in design to minimize repair costs should they need to be replaced. The forward cab steps will be a minimum 24.75" wide, and the crew cab steps will be 21.25" wide with an 8.00" minimum depth. The inside cab steps will not exceed 18.00" in height and be limited to two (2) steps.

CAB EXTERIOR HANDRAILS

Hansen knurled aluminum handrails will be provided adjacent to each cab and crew cab door opening to assist during cab ingress and egress. Each handrail will be provided with red LED lights. The lights will be activated when the headlight switch is activated and the parking brake is applied. The LED lights may be load managed.

STEP LIGHTS

There will be four (4) Whelen, Model 3SC0CDCR, 3.00" round white 12 volt DC LED lights installed a Whelen, Model 3FLANGE chrome flange.

- One (1) light will be installed in the driver's cab step well.
- One (1) light will be installed in the passenger's cab step well.
- One (1) light will be installed in the passenger's side crew cab step well.
- One (1) light will be installed in the driver's side crew cab step well.

The lights will be activated when the battery switch is on and the adjacent door is opened.

FENDER CROWNS

Rubber fender crowns will be installed at the cab wheel openings. The fender crowns will have a radius outside corner that will allow the fender crown to extend out further than the standard width crown, thus extending beyond the sidewall of the front tires and allow the crew cab doors to open fully.

CREW CAB WINDOWS

One (1) fixed window with tinted glass will be provided on each side of the cab, to the rear of the front cab door. The windows will be sized to enhance light penetration into the cab interior. The windows will measure 16.50" wide x 21.88" high.

The rear wall of the crew cab will have two (2) windows, each being 11.29" wide x 17.95" high.

CAB ROOF COVERING

Horizontal cab roof surfaces will be covered with bright aluminum treadplate. The fastening screws and the perimeter between the roof and the bottom of the aluminum treadplate, no more than 1.00" in from the edge of the aluminum treadplate, will be properly caulked to prevent water from leaking under aluminum. Front and side warning lights will not be mounted on top of treadplate. The treadplate will extend and terminate next to the warning lights.

MOUNTING PLATE ON ENGINE TUNNEL

Equipment installation provisions will be installed on the engine tunnel.

A 0.25" smooth aluminum plate will be bolted to the top surface of the engine tunnel, including the top of the engine blister. The plate will be spaced off the engine tunnel .75" to allow for wire routing below the plate. The mounting surface will be painted to match the cab interior.

CAB INTERIOR

The left and right side dash and center console will be a flat faced design to provide easy maintenance and will be constructed out of painted aluminum.

The engine tunnel will be padded and covered with leather grain vinyl resistant to oil, grease and mildew. For durability and ease of maintenance, the cab interior side walls will be painted aluminum. The rear wall will be painted aluminum.

The headliner will be installed in both forward and rear cab sections. Headliner material will be vinyl. A sound barrier will be part of its composition. Material will be installed on aluminum sheet and securely fastened to interior cab ceiling.

Forward portion of cab headliner will provide easy access for servicing electrical wiring or for other maintenance needs without removing the entire unit.

CAB INTERIOR UPHOLSTERY

The cab interior upholstery will be 36 oz gray vinyl.

CAB INTERIOR PAINT

The following metal surfaces will be painted gray, vinyl textured paint:

- Modesty panel in front of driver
- Vertical surface of dash in front of the officer (not applicable for recessed dash)
- Glove box in front of the officer (if applicable)
- Power distribution in front of the officer
- Rear heater vent panels

The remaining cab interior metal surfaces will be painted gray, vinyl texture paint.

FLOORING (CLEAN CAB)

The floor of the driver's / officers compartment and the floor of the crew area shall be covered with an aluminum diamond plate material for ease of cleaning. Edges of the insulation shall be trimmed with aluminum-extruded angle and sealed for a pleasing appearance. Underlayment material shall comply with NFPA noise and heat requirements.

CAB DEFROSTER

There will be a 41,000 BTU defroster in the cab located under the engine tunnel.

The defroster ventilation will be built into the design of the cab dash instrument panel and will be easily removable for maintenance.

The defroster will have a 3-speed blower and temperature controls accessible to the driver and officer.

The defroster ducts will be designed to provide maximum defrosting capabilities for the front cab windows.

CAB/CREW CAB HEATER

Two (2) auxiliary heaters with 32,000 BTU each will be provided in the cab. The heaters will have a 3-speed blower and temperature controls accessible to the driver and officer. There will also be louvers located below the rear facing seat riser and below the driver and officer positions for airflow. The heaters will be mounted, one (1) within each rear facing seat riser.

AIR CONDITIONING

A high-performance, customized air conditioning system will be furnished inside the cab and crew cab. A 19.10 cubic inch compressor will be installed on the engine.

The air conditioning system will be capable of cooling the average cab temperature from 100 degrees Fahrenheit to 72 degrees Fahrenheit at 50 percent relative humidity within 30 minutes. A roof-mounted condenser that meets and exceeds the performance specification will be installed on the cab roof. The condenser cover and mounting legs to be painted white as provided by the A/C manufacturer.

An evaporator unit that meets and exceeds the performance specification will be installed in the cab, located in the center of the cab ceiling over the engine tunnel. The evaporator will include two (2) high performance cores and plenums with multiple outlets, one (1) plenum directed to the front and one (1) plenum directed to the rear of the cab.

The evaporator unit will be provided with adjustable air outlets strategically located to direct air flow to the driver, officer and crew cab area.

The air conditioner will be controlled by a single electronic control panel. For ease of operation, the control panel will include variable adjustment for temperature and fan control and be conveniently located on the dash in clear view of the driver.

CAB AIR FILTRATION SYSTEM (HEPA)

Provide an HEPA air filtration system in the cab.

GRAVITY DRAIN TUBES

Two (2) condensate drain tubes will be provided for the air conditioning evaporator. The drip pan will have two (2) drain tubes plumbed separately to allow for the condensate to exit the drip pan.

WINDOW DEFROST FANS

Two (2) front window defrost fans will be mounted on the ceiling of the cab, one (1) on each side of the cab to assist in de-fogging the windshield.

CREW AREA FANS

Provide two (2), six (6) inch fans. They will be located in the crew area, one (1) each side on the rear wall. A switch located on the unit shall control the fans.

SUN VISORS

Two (2) smoked Lexan™ sun visors provided. The sun visors will be located above the windshield with one (1) mounted on each side of the cab.

There will be no retention bracket provided to help secure each sun visor in the stowed position.

GRAB HANDLE

A YELLOW rubber covered grab handle will be mounted on the lower portion of the driver's side cab entrance to assist in entering the cab. The grab handle will be securely mounted to the post area between the door and steering wheel column.

A long rubber grab handle will be mounted on the dash board in front of the officer.

ENGINE COMPARTMENT LIGHTS

There will be one (1) Whelen, Model 3SC0CDCR, 12 volt DC, 3.00" white LED light(s) with Whelen, Model 3FLANGEC, chrome flange kit(s) installed under the cab to be used as engine compartment illumination.

These light(s) will be activated automatically when the cab is raised.

ACCESS TO ENGINE DIPSTICKS

For access to the engine oil and transmission fluid dipsticks, there will be a door on the engine tunnel, inside the crew cab. The door will be on the rear wall of the engine tunnel, on the vertical surface.

The engine oil dipstick will allow for checking only. The transmission dipstick will allow for both checking and filling.

The door will have a rubber seal for thermal and acoustic insulation. One (1) flush latch will be provided on the access door.

CAB SAFETY SYSTEM

The cab will be provided with a safety system designed to protect occupants in the event of a side roll or frontal impact, and will include the following:

- A supplemental restraint system (SRS) sensor will be installed on a structural cab member behind the instrument panel. The SRS sensor will perform real time diagnostics of all critical subsystems and will record sensory inputs immediately before and during a side roll or frontal impact event.
- A slave SRS sensor will be installed in the cab to provide capacity for eight (8) crew cab seating positions.
- A fault-indicating light will be provided on the vehicle's instrument panel allowing the driver to monitor the operational status of the SRS system.
- A driver side front air bag will be mounted in the steering wheel and will be designed to protect the head and upper torso of the occupant, when used in combination with the 3-point seat belt.
- A passenger side knee bolster air bag will be mounted in the modesty panel below the dash panel and will be designed to protect the legs of the occupant, when used in combination with the 3-point seat belt.
- Air curtains will be provided in the outboard bolster of outboard seat backs to provide a cushion between occupant and the cab wall.
- Suspension seats will be provided with devices to retract them to the lowest travel position during a side roll or frontal impact event.
- Seat belts will be provided with pre-tensioners to remove slack from the seat belt during a side roll or frontal impact event.

FRONTAL IMPACT PROTECTION

The SRS system will provide protection during a frontal or oblique impact event. The system will activate when the vehicle decelerates at a predetermined G force known to cause injury to the occupants. The cab and chassis will have been subjected, via third party test facility, to a crash impact during frontal and oblique impact testing. Testing included all major chassis and cab components such as mounting straps for fuel and air tanks, suspension mounts, front suspension components, rear suspensions components, frame rail cross members, engine and transmission and their mounts, pump house and mounts, frame extensions and body mounts. The testing provided configuration specific information used to optimize the timing for firing the safety restraint system. The sensor will activate the pyrotechnic devices when the correct crash algorithm, wave form, is detected.

The SRS system will deploy the following components in the event of a frontal or oblique impact event:

- Driver side front air bag
- Passenger side knee bolster air bag
- Air curtains mounted in the outboard bolster of outboard seat backs
- Suspension seats will be retracted to the lowest travel position
- Seat belts will be pre-tensioned to firmly hold the occupant in place

SIDE ROLL PROTECTION

The SRS system will provide protection during a fast or slow 90 degree roll to the side, in which the vehicle comes to rest on its side. The system will analyze the vehicle's angle and rate of roll to determine the optimal activation of the advanced occupant restraints.

The SRS system will deploy the following components in the event of a side roll:

- Air curtains mounted in the outboard bolster of outboard seat backs
- Suspension seats will be retracted to the lowest travel position
- Seat belts will be pre-tensioned to firmly hold the occupant in place

SEATING CAPACITY

The seating capacity in the cab will be six (6).

H.O. BOSTROM ZIP CLEAN TANKER 500 CAB SEATING

Seating shall be H.O Bostrom Durawear Plus seating with Zip Clean Cushions.

DRIVER SEAT

A seat will be provided in the cab for the driver. The seat design will be a cam action type, with air suspension. The manual horizontal control will be a towel-bar style located below the forward part of the seat cushion. To provide flexibility for multiple driver configurations, the seat will have an adjustable reclining back. The seat back will be a high back style with side bolster pads for maximum support. The seat will include the following features incorporated into the side roll protection system:

- Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
- A suspension seat safety system will be included. When activated in the event of a side roll, this system will pretension the seat belt and retract the seat to its lowest travel position.

The seat will be furnished with a 3-point, shoulder type seat belt. The seat belt will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position.

OFFICER SEAT

A seat will be provided in the cab for the passenger. The seat will be a fixed type, with no suspension. To ensure safe operation, the seat will be equipped with seat belt sensors in the seat cushion and belt receptacle that will activate an alarm indicating a seat is occupied but not buckled.

The seat back will be an SCBA back style.

The seat will include the following features incorporated into the side roll protection system:

- Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
- A seat safety system will be included. When activated, this system will pretension the seat belt.

The seat will be furnished with a 3-point, shoulder type seat belt. The seat belt will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position.

REAR FACING DRIVER SIDE OUTBOARD SEAT

There will be one (1) rear facing seat provided at the driver side outboard position in the crew cab. The seat will be a fixed type, with no suspension. To ensure safe operation, the seat will be equipped with seat belt sensors in the seat cushion and belt receptacle that will activate an alarm indicating a seat is occupied but not buckled.

The seat back will be an SCBA back style.

The seat will include the following features incorporated into the side roll protection system:

- Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
- A seat safety system will be included. When activated, this system will pretension the seat belt.

The seat will be furnished with a 3-point, shoulder type seat belt. The seat belt will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position.

REAR FACING PASSENGER SIDE OUTBOARD SEAT

There will be one (1) rear facing seat provided at the passenger side outboard position in the crew cab. The seat will be a fixed type, with no suspension. To ensure safe operation, the seat will be equipped with seat belt sensors in the seat cushion and belt receptacle that will activate an alarm indicating a seat is occupied but not buckled.

The seat back will be an SCBA back style.

The seat will include the following features incorporated into the side roll protection system:

- Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
- A seat safety system will be included. When activated, this system will pretension the seat belt.

The seat will be furnished with a 3-point, shoulder type seat belt. The seat belt will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position.

FORWARD FACING CENTER SEATS

There will be two (2) forward facing foldup seats provided at the center position in the crew cab. To ensure safe operation, the seats will be equipped with seat belt sensors in the seat cushion and belt receptacle, which will activate an alarm indicating a seat is occupied but not buckled.

The seats will include the following feature incorporated into the side roll protection system:

- A seat safety system will be included. When activated, this system will pretension the seat belts around the occupants to firmly hold them in place in the event of a side roll.

The seats will be furnished with a 3-point, shoulder type seat belts. The seat belts will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position.

SEAT UPHOLSTERY

All seating shall be Grey tweed Durawear. With Zip-off seat covers a foam block encapsulated barrier shall be provided. All ABS formed material will be medium gray in color, as well as the seating and upholstery. The cab upholstered overhead and rear wall portions will be gray.

REPLACEMENT SEAT COVERS

Replacement covers shall be provided for each seat on the apparatus allowing for the apparatus to remain in service while cleaning.

AIR BOTTLE HOLDERS

All SCBA type seats in the cab will have a "Hands-Free" auto clamp style bracket in its backrest. For efficiency and convenience, the bracket will include an automatic spring clamp that allows the occupant to store the SCBA bottle by simply pushing it into the seat back. For protection of all occupants in the cab, in the event of an accident, the inertial components within the clamp will constrain the SCBA bottle in the seat and will exceed the NFPA standard of 9G. There will be a quantity of five (5) SCBA brackets.

SEAT BELTS

All seating positions in the cab, crew cab and tiller cab (if applicable) will have red seat belts. To provide quick, easy use for occupants wearing bunker gear, the female buckle and seat belt webbing length will meet or exceed the current edition of NFPA 1901 and CAN/ULC - S515 standards. The 3-point shoulder type seat belts will also include the Ready Reach D-loop assembly to the shoulder belt system. The Ready Reach feature adds an extender arm to the D-loop location placing the D-loop in a closer, easier to reach location.

SHOULDER HARNESS HEIGHT ADJUSTMENT

All seating positions furnished with 3-point shoulder type seat belts will include a height adjustment. This adjustment will optimize the belts effectiveness and comfort for the seated firefighter.

RADIO COMPARTMENT

A radio compartment will be provided under the officer's seat. The inside compartment dimensions will be 14.00" wide x 7.50" high x 14.50" deep. A drop-down door with a chrome plated lift and turn latch will be provided for access. The compartment will be constructed of smooth aluminum and painted to match the cab interior.

CREW SAFETY LIGHT

One (1) Green LED Whelen light shall be provided and be mounted in the interior cab ceiling area in a location visible to all firefighters seated in the jump seats. This light will illuminate GREEN whenever the parking brake is applied.

CAB DOME LIGHTS

There will be four (4) dual LED dome lights with black bezels provided. Two (2) lights will be mounted above the inside shoulder of the driver and officer and two (2) lights will be installed and located, one (1) on each side of the crew cab.

The color of the LED's will be red and white.

The white LED's will be controlled by the door switches and the lens switch.

The color LED's will be controlled by the lens switch.

In order to ensure exceptional illumination, each white LED dome light will provide a minimum of 10.1 foot-candles (fc) covering an entire 20.00" x 20.00" square seating position when mounted 40.00" above the seat.

HAND HELD LIGHT

There will be six (6) Streamlight, Fire Vulcan, Model #44451, hand lights provided with a vehicle mount with 12VDC direct wire charging rack and quick release buckle strap mounted on the engine tunnel area. Each light housing will be orange in color and be provided with a C4, LED and two (2) "ultra-bright blue tail light LEDs" The tail light LEDs will have a dual mode of blinking or steady.

CAB INSTRUMENTATION

The cab instrument panel will consist of gauges, an LCD display, telltale indicator lights, alarms, control switches, and a diagnostic panel. The function of instrument panel controls and switches will be identified by a label adjacent to each item. Actuation of the headlight switch will illuminate the labels in low light conditions. Telltale indicator lamps will not be illuminated unless necessary. The cab instruments and controls will be conveniently located within the forward cab section directly forward of the driver. Gauge and switch panels will be designed to be removable for ease of service and low cost of ownership.

CAB INTERIOR

The wrap-around style high impact ABS plastic cab dash fascia will be designed to provide unobstructed visibility to instrumentation. The dash layout will provide the driver with a quick reference to gauges that allows more time to focus on the road.

GAUGES

The gauge panel will include the following ten (10) ivory gauges with chrome bezels to monitor vehicle performance:

- Voltmeter Gauge (Volts):
 - Low volts (11.8 VDC)
 - Amber indicator on gauge assembly with alarm
 - High volts (15 VDC)
 - Amber indicator on gauge assembly with alarm
 - Very low volts (11.3 VDC)
 - Amber indicator on gauge assembly with alarm
 - Very high volts (16 VDC)
 - Amber indicator on gauge assembly with alarm
- Tachometer (RPM)
- Speedometer (Primary (outside) MPH, Secondary (inside) Km/H)
- Fuel Level Gauge (Empty - Full in fractions):
 - Low fuel (1/8 full)
 - Amber indicator on gauge assembly with alarm
 - Very low fuel (1/32) fuel
 - Amber indicator on gauge assembly with alarm
- Engine Oil Pressure Gauge (PSI):
 - Low oil pressure to activate engine warning lights and alarms
 - Red indicator on gauge assembly with alarm
- Front Air Pressure Gauge (PSI):
 - Low air pressure to activate warning lights and alarm
 - Red indicator on gauge assembly with alarm
- Rear Air Pressure Gauge (PSI):
 - Low air pressure to activate warning lights and alarm.
 - Red indicator on gauge assembly with alarm
- Transmission Oil Temperature Gauge (Fahrenheit):
- High transmission oil temperature activates warning lights and alarm
 - Amber indicator on gauge assembly with alarm
- Engine Coolant Temperature Gauge (Fahrenheit):
 - High engine temperature activates an engine warning light and alarm
 - Red indicator on gauge assembly with alarm
- Diesel Exhaust Fluid Level Gauge (Empty - Full in fractions):
 - Low fluid (1/8 full)
 - Amber indicator on gauge assembly with alarm

All gauges and gauge indicators will perform prove out at initial power-up to ensure proper performance.

INDICATOR LAMPS

To promote safety, the following telltale indicator lamps will be integral to the gauge assembly and are located above and below the center gauges. The indicator lamps will be "dead-front" design that is only visible when active. The colored indicator lights will have descriptive text or symbols.

The following amber telltale lamps will be present:

- Low coolant
- Trac cntl (traction control) (where applicable)
- Check engine
- Check trans (check transmission)
- Aux brake overheat (Auxiliary brake overheat)
- Air rest (air restriction)
- Caution (triangle symbol)
- Water in fuel
- DPF (engine diesel particulate filter regeneration)
- Trailer ABS (where applicable)
- Wait to start (where applicable)
- HET (engine high exhaust temperature) (where applicable)
- ABS (antilock brake system)
- MIL (engine emissions system malfunction indicator lamp) (where applicable)
- SRS (supplemental restraint system) fault (where applicable)
- DEF (low diesel exhaust fluid level)
- The following red telltale lamps will be present:
- Warning (stop sign symbol)
- Seat belt
- Parking brake
- Stop engine
- Rack down

The following green telltale lamps will be provided:

- Left turn
- Right turn
- Battery on

The following blue telltale lamp will be provided:

- High beam

ALARMS

Audible steady tone warning alarm: A steady audible tone alarm will be provided whenever a warning message is present.

Audible pulsing tone caution alarm: A pulsing audible tone alarm (chime/chirp) will be provided whenever a caution message is present without a warning message being present.

Alarm silence: Any active audible alarm will be able to be silenced by holding the ignition switch at the top position for three (3) to five (5) seconds. For improved safety, silenced audible alarms will intermittently chirp every 30 seconds until the alarm condition no longer exists. The intermittent chirp will act as a reminder to the operator that a caution or warning condition still exists. Any new warning or caution condition will enable the steady or pulsing tones respectively.

INDICATOR LAMP AND ALARM PROVE-OUT

Telltale indicators and alarms will perform prove-out at initial power-up to ensure proper performance.

CONTROL SWITCHES

For ease of use, the following controls will be provided immediately adjacent to the cab instrument panel within easy reach of the driver:

- Emergency master switch:
- Headlight / Parking light switch:
- High idle engagement switch: "Ok To Engage High Idle" indicator lamp: A green indicator light will be provided next to the high idle activation switch to indicate that the interlocks have been met to allow high idle engagement.
- Ignition switch:
- Engine start switch:
- 4-way hazard switch:
- Turn signal arm: A self-canceling turn signal with high beam headlight and windshield wiper/washer controls will be provided. The windshield wiper control will have high, low, and intermittent modes.
- Parking brake control: An air actuated push/pull park brake control valve will be provided.
- Chassis horn control: Activation of the chassis horn control will be provided through the center of the steering wheel.

CUSTOM SWITCH PANELS

The design of cab instrumentation will allow for emergency lighting and other switches to be placed within easy reach of the operator thus improving safety. All switches will have backlit labels for low light applications.

DIAGNOSTIC PANEL

A diagnostic panel will be accessible while standing on the ground and located inside the driver's side door left of the steering column. The diagnostic panel will allow diagnostic tools such as computers to connect to various vehicle systems for improved troubleshooting providing a lower cost of ownership. Diagnostic switches will allow ABS systems to provide blink codes should a problem exist. The diagnostic panel will include the following:

- Engine diagnostic port
- Transmission diagnostic port
- ABS diagnostic port
- SRS diagnostic port (where applicable)
- Command Zone USB diagnostic port
- ABS diagnostic switch (blink codes flashed on ABS telltale indicator)
- Diesel particulate filter regeneration switch (where applicable)
- Diesel particulate filter regeneration inhibit switch (where applicable)

CAB LCD DISPLAY

A digital four (4)-row by 20-character dot matrix display will be integral to the gauge panel. The display will be capable of showing simple graphical images as well as text. The display will be split into three (3) sections. Each section will have a dedicated function. The upper left section will display the outside ambient temperature. The upper right section will display odometer, trip mileage, PTO hours, fuel consumption, engine hours, and other configuration specific information. The bottom section will display INFO, CAUTION, and WARNING messages. Text messages will automatically activate to describe the cause of an audible caution or warning alarm. The LCD will be capable of displaying multiple text messages should more than one caution or warning condition exist.

AIR RESTRICTION INDICATOR

A high air restriction warning indicator light LCD message with amber warning indicator and audible alarm shall be provided.

"DO NOT MOVE APPARATUS" INDICATOR

A flashing red indicator light, located in the driving compartment, will be illuminated automatically per the current NFPA requirements. The light will be labeled "Do Not Move Apparatus If Light Is On." The same circuit that activates the Do Not Move Apparatus indicator will activate a pulsing alarm when the parking brake is released.

DO NOT MOVE TRUCK MESSAGES

Messages will be displayed on the Command Zone™, color display located within sight of the driver whenever the Do Not Move Truck light is active. The messages will designate the item or items not in the stowed for vehicle travel position (parking brake released).

Any other device that is opened, extended, or deployed that creates a hazard or is likely to cause damage to the apparatus if the apparatus is moved will be displayed as a caution message after the parking brake is released.

SWITCH PANELS

The emergency light switch panel will have a master switch for ease of use plus individual switches for selective control. Additional switch panel(s) will be located in the overhead position(s) above the windshield or in designated locations on the lower instrument panel layout. Officer side controls for all 12 volt scene lighting.

WIPER CONTROL

For simple operation and easy reach, the windshield wiper control will be an integral part of the directional light lever located on the steering column. The wiper control will include high and low wiper speed settings, a one (1)-speed intermittent wiper control and windshield washer switch. The control will have a "return to park" provision, which allows the wipers to return to the stored position when the wipers are not in use.

HOURLY METER - AERIAL DEVICE

An hour meter for the aerial device will be provided and located within the cab display or instrument panel.

AERIAL MASTER

There will be a master switch for the aerial operating electrical system provided.

AERIAL PTO SWITCH

A PTO switch for the aerial with indicator light will be provided.

SPARE CIRCUIT

There will be two (2) pair of wires, including a positive and a negative, installed on the apparatus. The above wires will have the following features:

- The positive wire will be connected directly to the battery power
- The negative wire will be connected to ground
- Wires will be protected to 15 amps at 12 volts DC
- Power and ground will terminate officer side dash area
- Termination will be with heat shrinkable butt splicing
- Wires will be sized to 125 percent of the protection

The circuit(s) may be load managed when the parking brake is set.

COMPUTER BRACKET (OFFICER POSITION)

Provide an IPORT - LAUNCH Rugged System for iPad 10.2-inch (8th gen) on the dash in front of the officer's position. (Location to be determined at pre construction.)

DUAL USB SOCKET

There shall be four (2) Blue Sea, Model 1016, dual USB type A charger sockets installed two in dashboard, (1) one on the driver's side and (1) one on the officers side.

INFORMATION CENTER

An information center employing a 7.00" diagonal touch screen color LCD display will be encased in an ABS plastic housing.

The information center will have the following specifications:

- Operate in temperatures from -40 to 185 degrees Fahrenheit
- An Optical Gel will be placed between the LCD and protective lens
- Five weather resistant user interface switches
- Grey with black accents
- Sunlight Readable
- Linux operating system
- Minimum of 1000nits rated display
- Display can be changed to an available foreign language
- A LCD display integral to the cab gauge panel will be included as outlined in the cab instrumentation area.
- Programmed to read US Customary

GENERAL SCREEN DESIGN

Where possible, background colors will be used to provide "At a Glance" vehicle information. If information provided on a screen is within acceptable limits, a green background will be used.

If a caution or warning situation arises the following will occur:

- An amber background/text color will indicate a caution condition
- A red background/text color will indicate a warning condition
- The information center will utilize an "Alert Center" to display text messages for audible alarm tones. The text messages will be written to identify the item(s) causing the audible alarm to sound. If more than one (1) text message occurs, the messages will cycle every second until the problem(s) have been resolved. The background color for the "Alert Center" will change to indicate the severity of the "warning" message. If a warning and a caution condition occur simultaneously, the red background color will be shown for all alert center messages.

- A label for each button will exist. The label will indicate the function for each active button for each screen. Buttons that are not utilized on specific screens will have a button label with no text or symbol.

HOME/TRANSIT SCREEN

This screen will display the following:

- Vehicle Mitigation (if equipped)
- Water Level (if the water level system includes compatible communications to the information center)
- Seat Belt Monitoring Screen
- Tire Pressure Monitoring (if equipped)
- Digital Speedometer
- Active Alarms

ON SCENE SCREEN

This screen will display the following and will be auto activated with pump engaged (if equipped):

- Battery Voltage
- Fuel
- Oil Pressure
- Coolant Temperature
- RPM
- Water Level (if equipped)
- Water Flow Rate (if equipped)
- Water Used (if equipped)
- Active Alarms

VIRTUAL BUTTONS

There will be four (4) virtual switch panel screens that match the overhead and lower lighting and HVAC switch panels.

PAGE SCREEN

The page screen will display the following and allow the user to progress into other screens for further functionality:

- Diagnostics
 - Faults
 - Listed by order of occurrence
 - Allows to sort by system
 - Interlock
 - Throttle Interlocks
 - Pump Interlocks (if equipped)
 - Aerial Interlocks (if equipped)
 - PTO Interlocks (if equipped)
 - Load Manager
 - A list of items to be load managed will be provided. The list will provide a description of the load.
 - The lower the priority numbers the earlier the device will be shed should a low voltage condition occur.
 - The screen will indicate if a load has been shed (disabled) or not shed.
 - "At a glance" color features are utilized on this screen.

- Systems
 - Command Zone
 - Module type and ID number
 - Module Version
 - Input or output number
 - Circuit number connected to that input or output
 - Status of the input or output
 - Power and Constant Current module diagnostic information
 - Pressure Controller
 - Generator Frequency (if equipped)
- Live Data
 - General Truck Data
- Maintenance
 - Engine oil and filter
 - Transmission oil and filter
 - Pump oil Aerial
 - Setup
 - Clock Setup
 - Date & Time
 - 12 or 24 hour format
 - Set time and date
 - Backlight
 - Daytime
 - Night time
 - Sensitivity
 - Unit Selection
 - Home Screen
 - Virtual Button Setup
 - On Scene Screen Setup
 - Configure Video Mode
 - Set Video Contrast
 - Set Video Color
 - Set Video Tint
- Do Not Move
 - The screen will indicate the approximate location and type of item that is open or is not stowed for travel. The actual status of the following devices will be indicate
 - Driver Side Cab Door
 - Passenger's Side Cab Door
 - Driver Side Crew Cab Door
 - Passenger's Side Crew Cab Door
 - Driver Side Body Doors
 - Passenger's Side Body Doors
 - Rear Body Door(s)
 - Hatch Door (if applicable)
 - Stabilizers (if applicable)
 - Steps (if applicable)

- Notifications
 - View Active Alarms
 - Shows a list of all active alarms including date and time of the occurrence is shown with each alarm
 - Silence Alarms - All alarms are silenced
- Timer Screen
- HVAC (if equipped)
- Tire Information (if equipped)
- Ascendant Set Up Confirmation (if equipped)

Button functions and button labels may change with each screen.

VEHICLE DATA RECORDER

There will be a vehicle data recorder (VDR) capable of reading and storing vehicle information provided. The information stored on the VDR can be downloaded through a USB port mounted in a convenient location determined by cab model. A USB cable can be used to connect the VDR to a laptop to retrieve required information. The program to download the information from the VDR will be available to download on-line.

The vehicle data recorder will be capable of recording the following data via hardwired and/or CAN inputs:

- Vehicle Speed - MPH
- Acceleration - MPH/sec
- Deceleration - MPH/sec
- Engine Speed - RPM
- Engine Throttle Position - % of Full Throttle
- ABS Event - On/Off
- Seat Occupied Status - Yes/No by Position
- Seat Belt Buckled Status - Yes/No by Position
- Master Optical Warning Device Switch - On/Off
- Time - 24 Hour Time
- Date - Year/Month/Day

SEAT BELT MONITORING SYSTEM

A seat belt monitoring system (SBMS) will be provided on the Command Zone™ color display and in the center overhead of the cab instrument panel. The SBMS will be capable of monitoring up to 10 seating positions indicating the status of each seat position per the following:

- Seat Occupied & Buckled = Green LED indicator illuminated
- Seat Occupied & Unbuckled = Red LED indicator with audible alarm
- No Occupant & Buckled = Red LED indicator with audible alarm
- No Occupant & Unbuckled = No indicator and no alarm

The seat belt monitoring screen will become active on the Command Zone color display when:

- The home screen is active:
 - and there is any occupant seated but not buckled or any belt buckled with an occupant.
 - and there are no other Do Not Move Apparatus conditions present. As soon as all Do Not Move Apparatus conditions are cleared, the SBMS will be activated.

The SBMS will include an audible alarm that will warn that an unbuckled occupant condition exists and the parking brake is released, or the transmission is not in park.

CLASS 1 ULTRAVIEW TOUCH 4.3

The apparatus shall be equipped with a Class 1 to display apparatus speed and systems status. The display shall be a rectangular shaped, weatherproof, digital display with super-bright digits at least 1/2" high. The display shall be capable of showing speed in either MPH or KPH. It shall be located for easy viewing by the officer in the right front seat.

ANTENNA INSTALLATION

Six (6) customer furnished antennas will be mounted on the cab roof and will be located as noted on the final approval drawing. The antennas will be furnished to the manufacturer prior to construction of the custom chassis. The attached antenna wires will be run to the right side cab behind the officer's seat, unless otherwise specified. (TBD Preconstruction conference)



RADIO CABLE INSTALLATION

Four (4) remote head radio cables will be furnished to the manufacturer prior to construction of the custom chassis. The wires will be run from behind the officer's seat, to the dashboard area for installation of customer radios. Unless otherwise specified. (TBD Preconstruction conference)

VEHICLE CAMERA

SYSTEM FRC 360 INVIEW CAMERA SYSTEM

The system shall include the following (4) HD Ultra-wide 1080p Cameras, (1) ECU with built in DVR, (1) External GPS Receiver, (1) Green Pushbutton—Screen Control, (1) Red Pushbutton—Event, (1) Black Pushbutton—Overlay, (1) Standard Definition Splitter, (1) IR Sensor, (1) Remote Control. A 7 inch monitor mounted in the cab readily observable by the operator.

INTERCOM SYSTEM – SIX SEATED POSITION

A FIRECOM custom designed intercom six-position communication system shall be provided and installed on the apparatus as follows.

INTERCOM- FIRECOM 5200D

A FIRECOM model 5200D DIGITAL INTERCOM 2 RADIO monitoring and primary transmit selection intercom shall be provided and installed in the unit. To include antenna and all necessary cabling and interface with Kenwood TK series mobile radios.

WIRELESS BASE STATION WB505R

Provide (2) WB505R wireless base stations to allow for the 6 members to be connected wirelessly.

HEADSET - FIRECOM SERIES- UHW 505 – WIRELESS DRIVER POSITION

There shall be a model UHW 505 wireless headset provided for the driver position. It shall have a (PTT) "Push to Talk" located on the dome. The headset shall come with an adjustable volume, noise canceling electric microphone, adjustable head strap, and flexible style boom for rotation of right or left dress. The headset shall provide high clarity speakers and fully shielded EMI/RFI protected cabling to maximize performance. The liquid foam ear, seals along with the system provides a 24 dB noise reduction.

HEADSET - FIRECOM - UHW 505 – WIRELESS OFFICER POSITION

There shall be a model UHW 505 wireless headset provided for the officer's position. It shall have a (PTT) "Push to Talk" located on the dome. The headset shall come with an adjustable volume, noise canceling electric microphone, adjustable head strap, and flexible style boom for rotation of right or left dress. The headset shall provide high clarity speakers and fully shielded EMI/RFI protected cabling to maximize performance. The liquid foam ear, seals along with the system provides a 24 dB noise reduction.

HEADSET - FIRECOM - UHW 503 - CREW POSITION –INTERCOM ONLY

There shall be four (4) model UHW 503 headset(s) provided for a crew-seated position. The headset shall wireless intercom transmit headset. It shall have a (PTT) "Push to Talk" located on the dome. The headset shall come with an adjustable volume, noise canceling electric microphone, adjustable head strap, and flexible style boom for rotation of right or left dress. The headset shall provide high clarity speakers and fully shielded EMI/RFI protected cabling to maximize performance. The liquid foam ear, a seal along with the system provides a 24 dB noise reduction. Each headset shall have a one-(1) year warranty.

HEADSET HANGER - FIRECOM SERIES-HGR-1

There shall be six (6) HGR-1 rubber coated headset hanger(s) provided with the apparatus.

ELECTRICAL POWER CONTROL SYSTEM

The primary power distribution will be located forward of the officer's seating position and be easily accessible while standing on the ground for simplified maintenance and troubleshooting. Additional electrical distribution centers will be provided throughout the vehicle to house the vehicle's electrical power, circuit protection, and control components. The electrical distribution centers will be located strategically throughout the vehicle to minimize wire length. For ease of maintenance, all electrical distribution centers will be easily accessible. All distribution centers containing fuses, circuit breakers and/or relays will be easily accessible.

Distribution centers located throughout the vehicle will contain battery powered studs for supplying customer installed equipment thus providing a lower cost of ownership.

Circuit protection devices, which conform to SAE standards, will be utilized to protect electrical circuits. All circuit protection devices will be rated per NFPA requirements to prevent wire and component damage when subjected to extreme current overload. General protection circuit breakers will be Type-I automatic reset (continuously resetting). When required, automotive type fuses will be utilized to protect electronic equipment. Control relays and solenoid will have a direct current rating of 125 percent of the maximum current for which the circuit is protected per NFPA.

SOLID-STATE CONTROL SYSTEM

A solid-state electronics based control system will be utilized to achieve advanced operation and control of the vehicle components. A fully computerized vehicle network will consist of electronic modules located near their point of use to reduce harness lengths and improve reliability. The control system will comply with SAE J1939-11 recommended practices.

The control system will operate as a master-slave system whereas the main control module instructs all other system components. The system will contain patented Mission Critical software that maintains critical vehicle operations in the unlikely event of a main controller error. The system will utilize a Real Time Operating System (RTOS) fully compliant with OSEK/VDX™ specifications providing a lower cost of ownership.

For increased reliability and simplified use the control system modules will include the following attributes:

- Green LED indicator light for module power
- Red LED indicator light for network communication stability status
- Control system self-test at activation and continually throughout vehicle operation
- No moving parts due to transistor logic
- Software logic control for NFPA mandated safety interlocks and indicators
- Integrated electrical system load management without additional components
- Integrated electrical load sequencing system without additional components
- Customized control software to the vehicle's configuration
- Factory and field re programmable to accommodate changes to the vehicle's operating parameters
- Complete operating and troubleshooting manuals
- USB connection to the main control module for advanced troubleshooting

To assure long life and operation in a broad range of environmental conditions, the solid-state control system modules will meet the following specifications:

- Module circuit board will meet SAE J771 specifications
- Operating temperature from -40C to +70C
- Storage temperature from -40C to +70C
- Vibration to 50g

IP67 rated enclosure (Totally protected against dust and also protected against the effect of temporary immersion between 15 centimeters and one (1) meter)

Operating voltage from eight (8) volts to 16 volts DC

The main controller will activate status indicators and audible alarms designed to provide warning of problems before they become critical.

CIRCUIT PROTECTION AND CONTROL DIAGRAM

Copies of all job-specific, computer network input and output (I/O) connections will be provided with each chassis. The sheets will indicate the function of each module connection point, circuit protection information (where applicable), wire numbers, wire colors and load management information.

ON-BOARD ADVANCED/VISUAL ELECTRICAL SYSTEM DIAGNOSTICS

The on-board information center will include the following diagnostic information:

- Text description of active warning or caution alarms
- Simplified warning indicators
- Amber caution indication with intermittent alarm
- Red warning indication with steady tone alarm

All control system modules, with the exception of the main control module, will contain on-board visual diagnostic LEDs that assist in troubleshooting. The LEDs will be enclosed within the sealed, transparent module housing near the face of the module. One LED for each input or output will be provided and will illuminate whenever the respective input or output is active. Color-coded labels within the modules will encompass the LEDs for ease of identification. The LED indicator lights will provide point of use information for reduced troubleshooting time without the need for an additional computer.

TECH MODULE WITH WIFI

An in cab module will provide WiFi wireless interface and data logging capability. The WiFi interface will comply with IEEE 802.11 b/g/n capabilities while communicating at 2.4 Gigahertz. The module will provide an external antenna connection allowing a line of site communication range of up to 300 feet with a roof mounted antenna.

The module will transmit a password protected web page to a WiFi enabled device (i.e. most smart phones, tablets or laptops) allowing two levels of user interaction. The firefighter level will allow vehicle monitoring of the vehicle and firefighting systems on the apparatus. The technician level will allow diagnostic access to inputs and outputs installed on the Command Zone™, control and information system. The data logging capability will record faults from the engine, transmission, ABS and Command Zone™, control and information systems as they occur. No other data will be recorded at the time the fault occurs. The data logger will provide up to 2 Gigabytes of data storage.

A USB connection will be provided on the Tech Module. It will provide a means to download data logger information and update software in the device.

PROGNOSTICS

A software based vehicle tool will be provided to predict remaining life of the vehicles critical fluid and events.

The system will send automatic indications to the Command Zone, color display and/or wireless enabled device to proactively alert of upcoming service intervals.

Prognostics will include:

- Engine oil and filter
- Transmission oil and filter
- Pump oil
- Aerial oil and filter

ADVANCED DIAGNOSTICS

An advanced, Windows-based, diagnostic software program will be provided for this control system. The software will provide troubleshooting tools to service technicians equipped with a Windows-based computer or wireless enabled device.

The service and maintenance software will be easy to understand and use and have the ability to view system input/output (I/O) information.

INDICATOR LIGHT AND ALARM PROVE-OUT SYSTEM

A system will be provided which automatically tests basic indicator lights and alarms located on the cab instrument panel.

VOLTAGE MONITOR SYSTEM

A voltage monitoring system will be provided to indicate the status of the battery system connected to the vehicle's electrical load. The system will provide visual and audible warning when the system voltage is below or above optimum levels.

The alarm will activate if the system falls below 11.8 volts DC for more than two (2) minutes.

DEDICATED RADIO EQUIPMENT CONNECTION POINTS

There will be three (3) studs provided in the primary power distribution center located in front of the officer for two-way radio equipment.

- The studs will consist of the following:
- 12-volt 40-amp battery switched power
- 12-volt 60-amp ignition switched power
- 12-volt 60-amp direct battery power

There will also be a 12-volt 100-amp ground stud located in or adjacent to the power distribution center.

ENHANCED SOFTWARE

The solid-state control system will include the following software enhancements:

All perimeter lights and scene lights (where applicable) will be deactivated when the parking brake is released.

Cab and crew cab dome lights will remain on for ten (10) seconds for improved visibility after the doors close. The dome lights will dim after ten (10) seconds or immediately if the vehicle is put into gear.

Cab and crew cab perimeter lights will remain on for ten (10) seconds for improved visibility after the doors close. The perimeter lights will dim after ten (10) seconds or immediately if the vehicle is put into gear.

EMI/RFI PROTECTION

To prevent erroneous signals from crosstalk contamination and interference, the electrical system will meet, at a minimum, SAE J551/2, thus reducing undesired electromagnetic and radio frequency emissions. An advanced electrical system will be used to ensure radiated and conducted electromagnetic interference (EMI) or radio frequency interference (RFI) emissions are suppressed at their source.

The apparatus will have the ability to operate in the electromagnetic environment typically found in fire ground operations to ensure clean operations. The electrical system will meet, without exceptions, electromagnetic susceptibility conforming to SAE J1113/25 Region 1, Class C EMR for 10KHz-1GHz to 100 Volts/Meter. The vehicle OEM, upon request, will provide EMC testing reports from testing conducted on an entire apparatus and will certify that the vehicle meets SAE J551/2 and SAE J1113/25 Region 1, Class C EMR for 10KHz-1GHz to 100 Volts/Meter requirements.

EMI/RFI susceptibility will be controlled by applying appropriate circuit designs and shielding. The electrical system will be designed for full compatibility with low-level control signals and high-powered two-way radio communication systems. Harness and cable routing will be given careful attention to minimize the potential for conducting and radiated EMI/RFI susceptibility.

ELECTRICAL

All 12-volt electrical equipment installed by the apparatus manufacturer will conform to modern automotive practices. All wiring will be high temperature crosslink type. Wiring will be run, in loom or conduit, where exposed and have grommets where wire passes through sheet metal. Automatic reset circuit breakers will be provided which conform to SAE Standards. Wiring will be color, function and number coded. Function and number codes will be continuously imprinted on all wiring harness conductors at 2.00" intervals.

Exterior exposed wire connectors will be positive locking, and environmentally sealed to withstand elements such as temperature extremes, moisture and automotive fluids.

Electrical wiring and equipment will be installed utilizing the following guidelines:

1. All holes made in the roof will be caulked with silicon. Large fender washers, liberally caulked, will be used when fastening equipment to the underside of the cab roof.
2. Any electrical component that is installed in an exposed area will be mounted in a manner that will not allow moisture to accumulate in it. Exposed area will be defined as any location outside of the cab or body.
3. Electrical components designed to be removed for maintenance will not be fastened with nuts and bolts. Metal screws will be used in mounting these devices. Also a coil of wire will be provided behind the appliance to allow them to be pulled away from mounting area for inspection and service work.
4. Corrosion preventative compound will be applied to all terminal plugs located outside of the cab or body. All non-waterproof connections will require this compound in the plug to prevent corrosion and for easy separation (of the plug).
5. All lights that have their sockets in a weather exposed area will have corrosion preventative compound added to the socket terminal area.
6. All electrical terminals in exposed areas will have silicon (1890) applied completely over the metal portion of the terminal.

All lights and reflectors, required to comply with Federal Motor Vehicle Safety Standard #108, will be furnished. Rear identification lights will be recessed mounted for protection. Lights and wiring mounted in the rear bulkheads will be protected from damage by installing a false bulkhead inside the rear compartments.

An operational test will be conducted to ensure that any equipment that is permanently attached to the electrical system is properly connected and in working order.

The results of the tests will be recorded and provided to the purchaser at time of delivery.

BATTERY SYSTEM

There will be four (4) 12 volt Exide®, Model 31S950X3W, batteries that include the following features will be provided:

- 950 CCA, cold cranking amps
- 190 amp reserve capacity
- High cycle
- Group 31
- Rating of 3800 CCA at 0 degrees Fahrenheit
- 760 minutes of reserve capacity
- Threaded stainless steel studs

Each battery case will be a black polypropylene material with a vertically ribbed container for increased vibration resistance. The cover will be manifold vented with a central venting location to allow a 45 degree tilt capacity.

The inside of each battery will consist of a "maintenance free" grid construction with poly wrapped separators and a flooded epoxy bottom anchoring for maximum vibration resistance.

STARTING SYSTEM

There will be a single starting system with an ignition switch and starter button provided and located on the cab instrument panel.

MASTER BATTERY SWITCH

There will be a master battery switch provided within the cab within easy reach of the driver to activate the battery system.

An indicator light will be provided on the instrument panel to notify the driver of the status of the battery system.

BATTERY COMPARTMENTS

Batteries will be stored in well-ventilated compartments that are located under the cab and bolted directly to the chassis frame. The battery compartments will be constructed **Stainless Steel** and be designed to accommodate a maximum of three (3) group 31 batteries in each compartment. The battery hold-downs will be of a non-corrosive material. All bolts and nuts will be stainless steel.

The compartments will include formed fit heavy duty roto-molded polyethylene battery trays with drain tubes for the batteries to sit in.

Heavy-duty battery cables will be used to provide maximum power to the electrical system. Cables will be color-coded.

Battery terminal connections will be coated with anti-corrosion compound. Battery solenoid terminal connections will be encapsulated with semi-permanent rubberized compound.

JUMPER STUDS

One (1) set of battery jumper studs with plastic color-coded covers will be installed on the bottom of the driver's side battery box. This will provide for easy jumper cable access.

BATTERY CHARGER

There will be an IOTA™, Model DSL 75, battery charger with IQ4, controller provided.

The battery charger will be wired to the AC shoreline inlet through an AC receptacle adjacent to this battery charger.

There will be a Kussmaul™, Model #091-94-12, remote indicator included.

The battery charger will be located in the left body compartment mounted on the left wall as high as possible.

The battery charger indicator will be located near the driver's seat riser with special bracketry.

AUTO EJECT FOR SHORELINE

There will be one (1) Kussmaul™, Model 091-55-20-120, 20 amp 120 volt AC shoreline inlet(s) provided to operate the dedicated 120 volt AC circuits on the apparatus.

The shoreline inlet(s) will include red weatherproof flip up cover(s).

There will be a release solenoid wired to the vehicle's starter to eject the AC connector when the engine is starting.

The shoreline(s) will be connected to the battery charger.

There will be a mating connector body supplied with the loose equipment.

There will be a label installed near the inlet(s) that state the following:

- Line Voltage
- Current Rating (amps)
- Phase
- Frequency

The shoreline receptacle will be located on the driver side of cab, above wheel.

ALTERNATOR

A C.E. Niehoff, model C680-1, alternator will be provided. It will have a rated output current of 430 amp as measured by SAE method J56. It will also have a custom three (3)-set point voltage regulator, manufactured by C. E. Niehoff. The alternator will be connected to the power and ground distribution system with heavy-duty cables sized to carry the full rated alternator output.

ELECTRONIC LOAD MANAGER

An electronic load management (ELM) system will be provided that monitors the vehicles 12-volt electrical system, automatically reducing the electrical load in the event of a low voltage condition, and automatically restoring the shed electrical loads when a low voltage condition expires. This ensures the integrity of the electrical system.

For improved reliability and ease of use, the load manager system will be an integral part of the vehicle's solid state control system requiring no additional components to perform load management tasks. Load management systems which require additional components will not be allowed.

The system will include the following features:

- System voltage monitoring.
- A shed load will remain inactive for a minimum of five minutes to prevent the load from cycling on and off.
- Sixteen available electronic load shedding levels.
- Priority levels can be set for individual outputs.
- High Idle to activate before any electric loads are shed and deactivate with the service brake.
 - If enabled:
 - "Load Man Hi-Idle On" will display on the information center.
 - Hi-Idle will not activate until 30 seconds after engine start up.
- Individual switch "on" indicator to flash when the particular load has been shed.

- The information center indicates system voltage.

The information center, where applicable, includes a "Load Manager" screen indicating the following:

- Load managed items list, with priority levels and item condition.
- Individual load managed item condition:
 - ON = not shed
 - SHED = shed

SEQUENCER

A sequencer will be provided that automatically activates and deactivates vehicle loads in a preset sequence thereby protecting the alternator from power surges. This sequencer operation will allow a gradual increase or decrease in alternator output, rather than loading or dumping the entire 12 volt load to prolong the life of the alternator.

For improved reliability and ease of use, the load sequencing system will be an integral part of the vehicle's solid state control system requiring no additional components to perform load sequencing tasks. Load sequencing systems which require additional components will not be allowed.

Emergency light sequencing will operate in conjunction with the emergency master light switch. When the emergency master switch is activated, the emergency lights will be activated one by one at half-second intervals. Sequenced emergency light switch indicators will flash while waiting for activation.

When the emergency master switch is deactivated, the sequencer will deactivate the warning light loads in the reverse order.

Sequencing of the following items will also occur, in conjunction with the ignition switch, at half-second intervals:

- Cab Heater and Air Conditioning
- Crew Cab Heater (if applicable)
- Crew Cab Air Conditioning (if applicable)
- Exhaust Fans (if applicable)
- Third Evaporator (if applicable)

HEADLIGHTS

There will be four (4) Truck-Lite®, rectangular LED lights mounted in the front quad style chrome housing on each side of the cab grille:

- the outside light on each side will contain a part number 27640C low beam module
- the inside light on each side will contain a part number 27645C high beam module

The low beam lights will be activated when the headlight switch is on.

The high beam and low beam lights will be activated when the headlight switch and the high beam switch is activated.

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DIRECTIONAL LIGHTS

There will be two (2) Whelen 600® series, LED combination directional/marker lights provided. The lights will be located on the outside cab corners, next to the headlights.

The color of the lenses will be the same color as the LED's.

INTERMEDIATE LIGHT

There will be two (2) Weldon, Model 9186-8580-29, amber LED turn signal marker lights furnished, one (1) each side, in the rear fender panel. The light will double as a turn signal and marker light.

CAB CLEARANCE/MARKER/ID LIGHTS

There will be seven (7) amber LED lights provided to indicate the presence and overall width of the vehicle in the following locations:

- Three (3) amber LED identification lights will be installed in the center of the cab above the windshield.
- Two (2) amber LED clearance lights will be installed, one (1) on each outboard side of the cab above the windshield.
- Two (2) amber LED marker lights will be installed, one (1) on each side above the cab doors.

FRONT CAB SIDE DIRECTIONAL/MARKER LIGHTS

There will be two (2) Truck-Lite®, Model 19036Y, amber LED lights installed to the outside of the chrome wrap around bezel, one (1) on each side of the cab.

The lights will activate as marker lights with the headlight switch and directional lights with the corresponding directional circuit.

REAR CLEARANCE/MARKER/ID LIGHTING

There will be three (3) LED identification lights located at the rear of the apparatus installed per the following:

- As close as practical to the vertical centerline and one (1) on each outside edge
- Centers spaced not less than 6.00" or more than 12.00" apart
- Red in color
- All at the same height
- All visible from the rear

There will be two (2) LED lights installed at the rear of the apparatus used as clearance lights located at the rear of the apparatus per the following:

- To indicate the overall width of the vehicle
- One (1) each side of the vertical centerline
- As near the top as practical
- Red in color
- To be visible from the rear
- All at the same height
- There will be two (2) LED lights installed on the side of the apparatus used as marker lights as close to the rear as practical per the following:
 - To indicate the overall length of the vehicle
 - One (1) each side of the vertical centerline
 - As near the top as practical
 - Red in color
 - To be visible from the side
 - All at the same height

There will be two (2) red reflectors located on the rear of the truck facing to the rear. One (1) each side, as far to the outside as practical, at a minimum of 15.00", but no more than 60.00", above the ground.

There will be two (2) red reflectors located on the side of the truck facing to the side. One (1) each side, as far to the rear as practical, at a minimum of 15.00", but no more than 60.00", above the ground.

Per FMVSS 108 and CMVSS 108 requirements.

MARKER LIGHTS

There will be one (1) pair of amber and red LED marker lights with rubber arm, located at the rear most lower corner of the body. The amber lens will face the front and the red lens will face the rear of the truck. These lights will be activated with the running lights of the vehicle.

REAR FMVSS LIGHTING

The rear stop/tail and directional LED lighting will consist of the following:

- Two (2) Whelen®, Model M6BTT, red LED stop/tail lights
- Two (2) Whelen, Model M6T, amber LED arrow turn lights

The lights shall be provided with color lenses.

The lights will be mounted in a polished combination housing.

There will be two (2) Whelen Model M6BUW, LED backup lights provided in the tail light housing.

LIGHTING BEZEL

There will be two (2) Whelen, Model M6FCV4P, four (4) place chromed ABS housings provided for the rear M6 series stop/tail, directional, back up, scene lights or warning lights.

LICENSE PLATE BRACKET

There will be one (1) license plate bracket mounted on the rear of the body.

A white LED light will illuminate the license plate. A polished stainless steel light shield will be provided over the light that will direct illumination downward, preventing white light to the rear.

BACK-UP ALARM

A PRECO, Model 1040, solid-state electronic audible back-up alarm that actuates when the truck is shifted into reverse will be provided. The device will sound at 60 pulses per minute and automatically adjust its volume to maintain a minimum ten (10) dBA above surrounding environmental noise levels.

CAB PERIMETER SCENE LIGHTS

There will be four (4) Amdor, Model AY-LB-12HW020, 350 lumens each, 20.00" white LED strip lights provided, one (1) for each cab door.

These lights will be activated automatically when the battery switch is on and the exit doors are opened or by the same means as the body perimeter scene lights.

PUMP HOUSE PERIMETER LIGHTS

There will be one (1) Amdor, Model AY-LB-12HW020, 350 lumens, 20.00" LED weatherproof strip light with bracket provided under the passenger's side pump panel running board.

If the combination of options in the vehicle does not permit clearance for a 20.00" light, a 12.00" version of the Amdor light will be installed.

The light will be activated when the battery switch is on, and controlled by the same means as the body perimeter lights.

BODY PERIMETER SCENE LIGHTS

There will be three (3) Amdor®, Model AY-LB-12HW012, 190 lumen, 12.00" long, white 12 volt DC LED strip lights provided.

The lights will be mounted in the following locations.

- One (1) light will be provided under the left side turntable access steps
- One (1) light will be provided under the left side basket access steps
- One (1) light will be provided under the right side basket access steps

The perimeter scene lights will be activated when the parking brake is applied.

STEP LIGHTS

White LED, step lights will be provided on the aerial body in the following locations:

One (1) light on the driver side, front bulkhead.

In order to ensure exceptional illumination, each light will provide a minimum of 25 foot-candles (fc) covering an entire 15" x 15" square placed ten (10) inches below the light and a minimum of 1.5 fc covering an entire 30" x 30" square at the same ten (10) inch distance below the light.

The lights will be actuated with the pump panel light switch.

All other steps on the apparatus will be illuminated per the current edition of NFPA 1901.

12 VOLT LIGHTING

There will be one (1) Whelen® Model S30M**, 12,960 lumens 30.00" long 12 volt DC light(s) provided on visor bracket(s) hanging off the front of the cab roof over the windshield located centered on a bracket. The painted parts of this light assembly to be white.

The light(s) will include the following:

- Six (6) scene light modules with white LEDs
- Three (3) amber LED modules as marker lights that are not activated.
- Two (2) additional LED modules. The additional modules to be two (2) scene light modules with white LEDs

The lights will be activated per the following:

- The scene LEDs will be controlled by a switch at the driver's side switch panel and by a switch at the passenger's side (officers) switch panel.
- There will be a switch in the cab on the switch panel to control the flashing or spot LED modules.
- Amber flashing LED modules will be deactivated when the parking brake is released.
- The white scene and flashing LED modules may be load managed when the parking brake is applied.

12 VOLT DC SCENE LIGHTS

There will be one (2) Whelen® Model S30M**, 12,960 lumens 30.00" 12 volt DC light(s) with white LEDs provided on the left and right side of the cab roof located, over the center cab window.. The painted parts of this light assembly to be white.

The light(s) will include the following:

- Six (6) scene light modules with white LEDs
- Three (3) amber LEDs as marker lights
- Two (2) additional LED modules. The additional modules to be two (2) scene light modules with white LEDs.

The lights will be activated per the following:

- The scene LEDs will be controlled when the cab or crew cab doors on the passenger's side are open.
- There will be a switch in the cab on the switch panel to control the flashing or spot LED modules.

HIVIZ LIGHTING - LASER LIGHT CANNON

Provided two (2) Hiviz Laser lights one (1) each side to indicate location of jack upon deployment.

Switching shall be provided at both locations driver and officer switch panel.

12 VOLT LIGHTING

There will be one (2) Whelen® Model S44M**, 19,440 lumens 44.00" 12 volt DC light(s) with white LEDs provided on the left and right side of the body located, approximately half way down the left side.. The painted parts of this light assembly to be white.

The light(s) will include the following:

- Six (6) scene light modules with white LEDs
- Three (3) amber LEDs as marker lights
- Two (2) additional LED modules. The additional modules to be two (2) scene light modules with white LEDs.

The lights will be activated per the following:

- The amber marker lights not activated.
- The scene LEDs will be controlled by a switch at the driver's side switch panel, by a switch at the driver's side pump panel and by a switch at the passenger's side switch panel.
- There will be a switch in the cab on the switch panel to control the flashing or spot LED modules.
- The light(s) may be load managed when the parking brake is applied.

HOSE BED LIGHTS

There will be white 12 volt DC LED light strips with stainless steel protective cover provided to light the hose bed area. Hose bed lights will meet the photometric levels listed in NFPA 1901 for Hose Bed lighting requirements.

- Light strip will be installed along the front edge of the hose bed.
- Light strip will be installed on the rear of the boom support.

The lights will be activated by a cup switch at the rear of the apparatus no more than 72.00" from the ground.

REAR SCENE LIGHTS

There will be two (2) Whelen, Model M6ZC, LED scene lights installed at the rear of the apparatus. These lights will be installed between 58.00" and 72.00" above the ground.

The lights will be controlled by a switch at the driver's side switch panel.

WALKING SURFACE LIGHT

There will be two (2) Model P25 12 volt DC LED lights provided to illuminate the top of body walking surface. These LED lights will be located on the rear facing surface of the upper portion of the body to illuminate the walking surface to the platform basket. There will be a Model FRP, 4" round black 12 volt DC LED floodlight located forward on the left side top of the body.

These lights will be activated when the body step lights are on.

WATER TANK

The water tank will have a capacity of 300 gallons and will be constructed of UV stabilized ultra-high impact polypropylene plastic.

The joints and seams will be nitrogen welded inside and out.

The tank will be baffled in accordance with the current edition of NFPA 1901 requirements.

The baffles will have vent openings at both the top and bottom of each baffle to permit movement of air and water between compartments.

The longitudinal partitions will be constructed of 0.38" polypropylene plastic and extend from the bottom of the tank through the top cover to allow positive welding.

The transverse partitions extend from 4.00" off the bottom to the underside of the top cover.

All partitions interlock and will be welded to the tank bottom and sides.

The tank top will be constructed of 0.50" polypropylene.

It will be recessed 0.38" and will be welded to the tank sides and the longitudinal partitions. It will be supported to keep it rigid during fast filling conditions. Construction will include 2.00" polypropylene dowels spaced no more than 30.00" apart and welded to the transverse partitions.

Two (2) of the dowels will be drilled and tapped (0.50" diameter, 13.00" deep) to accommodate lifting eyes. A sump will be provided at the bottom of the water tank. The sump will include a drain plug and the tank outlet.

Tank will be installed on top of the torque box with the use of two (2) brackets constructed of structural steel. The torque box will resist transferring any torsional stress caused by the chassis frame flexing to the water tank.

Sufficient cross-members will be provided to properly support the bottom of the tank.

Cross-members are constructed of steel bar channel or rectangular tubing.

Rubber cushions, 0.50" thick x 3.00" wide, will be placed on all horizontal surfaces that the tank rests on.

Stops will be provided to prevent an empty tank from bouncing excessively while moving vehicle.

Tank mounting system will be approved by the manufacturer.

Fill tower will be constructed of .50" polypropylene and will be a minimum of 6.00" wide x 12.00" long.

Fill tower will be furnished with a .25" thick polypropylene screen and a hinged cover.

An overflow pipe, constructed of 3.00" schedule 40 polypropylene, will be installed approximately halfway down the fill tower and extend through the water tank and exit to the rear of the rear axle.

HOSE BED

The hose bed will be fabricated of 0.125" 5052-H32 aluminum with a tensile strength range of 31,000 to 38,000 psi.

The upper and rear edges of the hose bed side panels will have a double break for rigidity.

The hose bed will be located ahead of the ladder turntable.

There will be two hose chutes on each side and rear of the hose bed on the right side to allow for payout/removal of the hose from a dual hose bed.

The hose bed flooring will consist of removable aluminum grating with a top surface that is perforated to aid in hose aeration.

Hose capacity will be a minimum of 500 feet of 5.00" large diameter Key Echo 10 fire hose on one side and 500 feet of 3.00" of Key Echo 10 fire hose on the other.

HOSE BED HOSE RESTRAINT

The hose in the hose bed will be restrained as follows:

- The hose bed forward of the aerial boom support and in the upper body area will be restrained by a black vinyl cover with bungee cord loops and hooks. Cut out shall be provided for the water tank tower.
- The hose bed chute(s) located under the aerial basket will be restrained by an aluminum tread plate cover and guide plate at the transition point of the upper hose bed to the lower hose chute. The cover will hinge to the inside to allow ease of access to the hose.
- The rear of the hose bed chute(s) will be restrained with black webbing that will have 1.00" web straps that loop through footman loops and fasten with spring clip and hook fasteners.

RUNNING BOARDS

The running boards will be fabricated of 0.125" bright aluminum tread plate and supported by structural steel angle assemblies bolted to the chassis frame rails.

Running boards will be 13.00" deep and are spaced away from the body 0.50".

A splash guard will be provided to keep road dirt or water from splashing up onto the pump panels.

The running boards will have a riser on the body to protect the painted surface from damage by stepping on the running boards.

The entire surface of the running boards will be covered with bright aluminum tread plate.

TURNTABLE STEPS

Access to the turntable will be provided by a set of swing-down steps on the left side of the truck.

The access steps will be located just behind the front body and in front of the middle stabilizer.

All steps will have a height no greater than 14.00" from top surface to top surface.

The swing down step mechanism will be constructed of brushed aluminum with aluminum tread plate steps.

The steps will be designed with a grip pattern punched into the tread plate material to provide support, slip resistance, and drainage.

The stepwell will be lined with bright aluminum tread plate to act as scuff plates.

Holes will be provided in each side step plate for hand holds.

The bottom step will have a step height not exceeding 24.00" from the ground to the top surface of the step at any time.

The steps will be connected to the "Do Not Move Truck" indicator in the cab.

STEP LIGHTS

There will be three (3) white LED step lights provided for the aerial turntable access steps.

In order to ensure exceptional illumination, each light shall provide a minimum of 25 foot-candles (fc) covering an entire 15" x 15" square placed ten (10) inches below the light and a minimum of 1.5 fc covering an entire 30" x 30" square at the same ten (10) inch distance below the light.

The step lights will be actuated by the aerial master switch in the cab.

SMOOTH ALUMINUM REAR WALL

The rear wall will be smooth aluminum.

TOW EYES

Two (2) rear painted tow eyes will be located at the rear of the apparatus and will be mounted directly to the frame rails. The inner and outer edges of the tow eyes will be radiused.

REAR BUMPER

A 3.00" rear bumper will be furnished. Bumper will be constructed of steel and will be covered with polished aluminum treadplate. The bumper will be 2.50" deep x 3.50" high and will be spaced away from the body approximately 0.50". It will extend the full width of the body.

UNDERBODY SUPPORT SYSTEM

The backbone of the body support system will begin with the aerial torque box which is the strongest component of the apparatus and is designed for sustaining maximum loads.

An aluminum body structure will be mounted to the aerial torque box at four (4) points using neoprene elastomer isolators. The front mounts will attach from structural steel brackets on the sides of the torque box to a structural tube on the body. The rear mounts will attach structural members on the rear body to the top of the rear down rigger mounting structure.

The combination of the elastomer isolators and the body structure design allow the chassis and torque box to flex without driving loads into the body.

The compartment floor support design will result in an 800lb equipment support rating per lower compartment, and a 500lb equipment support rating for the upper, over the axle compartments.

AGGRESSIVE WALKING SURFACE

All exterior surfaces designated as stepping, standing, and walking areas will comply with the required average slip resistance of the current NFPA standards.

TESTING OF BODY DESIGN

Body structural analysis will be fully tested. Proven engineering and test techniques such as finite element analysis, model analysis, and strain gauging have been performed with special attention given to fatigue, life and structural integrity of the body and substructure.

The body will be tested while loaded to its greatest in-service weight.

The criteria used during the testing procedure will include:

- Raising opposite corners of the vehicle tires 9.00" to simulate the twisting a truck may experience when driving over a curb.
- Making a 90 degree turn, while driving at 20 mph to simulate aggressive driving conditions.
- Driving the vehicle on at 35 mph on a washboard road.
- Driving the vehicle at 55 mph on a smooth road.
- Accelerating the vehicle fully, until reaching the approximate speed of 45 mph on rough pavement.

Evidence of the actual testing techniques will be made available upon request.

COMPARTMENTATION

Compartmentation will be fabricated of 0.125" 5052 aluminum.

Side compartments will be an integral assembly with the rear fenders.

Circular fender liners will be provided. For prevention of rust pockets and ease of maintenance, the fender liners will be formed from aluminum and removable for maintenance.

Compartment flooring will be of the sweep out design with the floor higher than the compartment door lip. Drip protection will be provided above the doors by means of bright aluminum extrusion, formed bright aluminum tread plate or polished stainless steel.

The top of the compartment will be covered with bright aluminum tread plate rolled over the edges on the front, rear and outward side. These covers will have the corners welded.

Side compartment covers will be separate from the compartment tops.

All screws and bolts, which are not Grade 8, will be stainless steel and where they protrude into a compartment will have acorn nuts on the ends to prevent injury.

LEFT SIDE COMPARTMENTATION

A full height single lap door compartment ahead of the rear wheels will be provided. The compartment will be 29.13" wide x 28.25" high x 27.13" deep inside with a door opening of 26.13" wide x 26.25" high.

A full height single lap door compartment forward above the fender compartment and over the rear wheels will be 16.25" wide x 20.06" high x 27.13" deep. The door opening will be 14.63" wide x 18.50" high.

There will be a removable access panel provided on the forward side of this compartment to allow access to the reel.

One (1) liftup door compartment rearward above the fender compartments and over the rear axles will be provided. The compartment will be 84.00" wide x 22.13" high x 27.13" deep inside with a door opening of 81.00" wide x 19.13" high.

A full height double door compartment behind the rear wheels will be 41.25" wide x 53.88" high x 27.13" deep. The door opening will be 38.25" wide x 51.88" high.

One (1) single lap door compartment behind the rear stabilizer will be provided. The compartment will be 18.13" wide x 45.75" high x 27.13" deep inside with a door opening of 15.13" wide x 42.75" high.

RIGHT SIDE COMPARTMENTATION

A full height single lap door compartment ahead of the front stabilizer will be provided. The compartment will be 18.38" wide x 35.25" high x 9.91" deep with a door opening of 15.38" wide x 33.25" high.

A full height single lap door compartment ahead of the rear wheels will be 29.13" wide x 28.25" high x 27.13" deep inside with a door opening of 26.13" wide x 26.25" high.

A full height single lap door compartment forward above the fender compartment and over the rear wheels will be 16.25" wide x 20.06" high x 27.13" deep. The door opening will be 14.63" wide x 18.50" high. There will be a removable access panel provided on the forward side of this compartment to allow access to the reel.

One (1) liftup door compartment rearward above the fender compartments and over the rear axles will be provided. The compartment will be 84.00" wide x 22.13" high x 27.13" deep inside with a door opening of 81.00" wide x 19.13" high.

A full height double door compartment behind the rear wheels will be 41.25" wide x 53.88" high x 27.13" deep. The door opening will be 38.25" wide x 51.88" high.

One (1) single lap door compartment behind the rear stabilizer will be provided. The compartment will be 18.13" wide x 45.75" high x 27.13" deep inside with a door opening of 15.13" wide x 42.75" high.

SIDE COMPARTMENT DOORS

All hinged compartment doors will be lap style with double panel construction and fabricated of .09" 5052H32 aluminum. Doors will be a minimum of 1.50" thick. To provide additional door strength, a "C" section reinforcement will be installed between the outer and interior panels.

Doors will be provided with a closed cell rubber gasket around the surface that laps onto the body. A second heavy-duty automotive rubber molding with a hollow core will be installed on the door framing that seals onto the interior panel, to ensure a weather resisting compartment.

All compartment doors will have polished stainless steel continuous hinge with a pin diameter of .25", that is bolted or screwed on with stainless steel fasteners. A dielectric substance will be applied to each hinge fastener.

All door lock mechanisms will be fully enclosed within the door panels to prevent fouling of the lock in the event equipment inside shifts into the lock area.

Doors will be latched with recessed, polished stainless steel "D" ring handles and Eberhard 106 locks. To prevent corrosion caused by dissimilar metals, compartment door handles will not be attached to outer door panel with screws. A rubber gasket will be provided between the "D" ring handle and the door.

LOUVERS

All body compartments will be vented to provide one (1) way airflow out of the compartment that prevents water and dirt from gaining access to the compartment.

COMPARTMENT LIGHTING

There will be nine (9) compartment(s) with two (2) white 12 volt DC LED compartment light strips. The dual light strips will be centered vertically along each side of the door framing. There will be two (2) light strips per compartment. The dual light strips will be in all body compartment(s).

Any remaining compartments without light strips will have a Whelen, Model 3SC0CDCR, 12 volt DC, 3.00" white LED light(s) with Whelen, Model 3FLANGEC, chrome flange kit(s) Opening the compartment door will automatically turn the compartment lighting on.

MOUNTING TRACKS

There will be recessed tracks installed vertically to support the adjustable shelf(s).

Tracks will not protrude into any compartment in order to provide the greatest compartment space and widest shelves possible.

The tracks will be provided in each compartment except for the one that contains the pump operator's panel.

ADJUSTABLE SHELVES

There will be six (6) shelves with a capacity of 500 lb provided.

The shelf construction will consist of .188" aluminum painted spatter gray with 2.00" sides.

Each shelf will be infinitely adjustable by means of a threaded fastener, which slides in a track.

The shelves will be held in place by .12" thick stamped plated brackets and bolts.

The location(s) will be in RS1 centered between the floor and the ceiling, in RS2 centered between the floor and the ceiling, in RS5 centered between the floor and the ceiling, in LS1 centered between the floor and ceiling, in LS3 centered between the floor and ceiling and in LS5 centered between the floor and ceiling.

SLIDE-OUT ADJUSTABLE HEIGHT TRAY

There will be four (4) slide-out trays provided.

Each tray will have 2.00" high sides and a minimum capacity rating of 250 lb in the extended position.

Each tray will be mounted on a pair of side mounted slides. The slide mechanisms will have ball bearings for ease of operation and years of dependable service. The slides will be mounted to shelf tracks to allow the tray to be adjustable up and down within the designated mounting location. The slide tracks shall have a 100% extension, allowing the tray to extend out of the compartment completely.

An automatic lock will be provided for both the in and out tray positions. The lock trip mechanism will be located at the front of the tray and will be easily operated with a gloved hand.

The tray(s) locations will be located to be determined at plan review.

MATTING, COMPARTMENT TRAYS AND SHELVES

Dri-Deck rubber compartment matting will be provided in the compartments on compartment trays and shelves. The compartment trays and shelves locations will be: all trays and shelves.

The Dri-Deck will be black, and .562" thick with holes in the decking to allow air to flow.

MATTING, COMPARTMENT FLOOR

Dri-Deck rubber compartment matting will be provided in compartments on the compartment floor. The locations are, all compartments.

The Dri-Deck will be black and .562" thick with holes in the decking to allow air to flow. The leading edge of the matting will include the beveled edge.

RUB RAIL

Provide sacrificial rub rails made of poly hard plastic with reflective stripe material. The rail to be mounted at the base of the body, extend outward a minimum 3/4", downward 2", and flange inward 1". The rub rails shall extend the full length of the main body and wrap around the rear body corners. Rub rails will be designed to bolt to the body from the bottom side of the compartment area, so as not to damage the body side panels on initial impact and to provide for ease of replacement.

BODY FENDER CROWNS

Rubber fender crowns will be provided around the rear wheel openings.

An unpainted fender liner will be provided to avoid paint chipping. The liners will be removable to aid in the maintenance of rear suspension components.

A dielectric barrier will be provided between the fender crown fasteners (screws) and the fender sheet metal to prevent corrosion.

The fender crowns will be held in place with stainless steel screws that thread directly into a composite nut and not directly into the parent body sheet metal to eliminate dissimilar metals contact and greatly reduce the chance for corrosion.

CAB EXTERIOR HANDRAILS LED

A Hansen knurled aluminum handrails will be provided adjacent to each cab and crew cab door opening to assist during cab ingress and egress. Each handrail will be provided with red LED lights. The lights will be activated when the headlight switch is activated and the parking brake is applied. The LED lights may be load managed.

THREE AIR BOTTLE, STORAGE COMPARTMENT

A total of two (2) air bottle compartments will be provided and located one (1) on the driver's side and one (1) on the passenger's side centered between the tandem rear wheels. The air bottle compartment will consist of individual bins each designed to hold an air bottle with a maximum diameter of 7.50" and a maximum depth of 26.00".

Each compartment will hold three (3) air bottles, two (2) stored next to each other in the top area, and one (1) stored centered below. Each bottle will be separated by a partition.

A drain hole and black rubber matting will be provided on the floor of each compartment. A lift up door with stay arm device with pair of flush lift & turn latches will be provided for each compartment. The door will be polished stainless steel. A dielectric barrier will be provided between the door hinge, hinge fasteners and the body sheet metal.

AIR BOTTLE COMPARTMENT STRAP

Straps will be provided in the air bottle compartment(s) to help contain the air bottles. The straps will wrap around the neck of each bottle and attach to the wall of the compartment.

GROUND LADDERS 183'

EXTENSION LADDER(S)

There will be One (1) 35' two (2) section aluminum Duo-Safety Series 1200-A extension ladder provided and located in the aerial torque box.

There will be two (2) 28' two (2) section aluminum Duo-Safety Series 1200-A extension ladder provided and located in the aerial torque box.

There will be one (1) 24' two (2) section aluminum Duo-Safety Series 1200-A extension ladder provided and located in the aerial torque box.

ROOF LADDER

There will be two (2) aluminum Duo-Safety roof ladder w hooks (1) 875A, 16' and (1) 775A, 14' with hooks on both ends (ladder mounted)

ADDED ROOF LADDER

There will be one (1) 20' roof, aluminum, Series 875-A provided.

AERIAL FOLDING LADDER

There will be two (2) aluminum Duo-Safety Series 585-A folding ladder(s) provided and located in the aerial torque box. (1) 8' and (1) 10'

LITTLE GIANT M13

Provisions for the storage of a Little Giant M 13' (storage height 3'7" or 1.09m.) Ladder shall be provided. Location to be determined during pre-construction.

GROUND LADDER STORAGE

The ground ladders are stored within the torque box and are removable from the rear.

Ladders will be enclosed to prevent road dirt and debris from fouling or damaging the ladders.

The ladders rest in full length stainless steel slides and are arranged in such a manner that any one ladder can be removed without having to move or remove any other ladder.

An **Amdor rollup door** will be provided at the rear, double faced, aluminum construction, and painted one (1) color to match the lower portion of the body. A non-locking lift bar to be provided for each roll-up door. The latching mechanism will consist of a full length lift bar lock with latches on the outer extrusion of the door frame.

A stainless plate with a 2-bend flange and a stainless steel hinge will be provided to secure the aerial ladder complement. The plate assembly will be mounted to the bottom of the entrance of the torque box ladder storage area.

When the plate is vertical, it will secure the ladders and prevent them from migrating to the rear of the apparatus. When the plate is down and not securing the ladders, the rollup door cannot close, which will activate the "Open Door Indicator Light" within the cab. The hinged plate will have a positive latching feature that will secure the plate in the vertical position.

GENERATOR STORAGE

Provisions will be made in the compartment below the ladder storage for locating a hydraulic generator.

LADDER STORAGE LIGHTING

There will be 36.00" white 12 volt DC LED strip lights provided to illuminate the torque box ladder storage area and the compartment directly below the ladder storage. One (1) light will be provided on each side of the ladder storage area.

The lights will be activated when the ladder storage compartment door is opened.

PIKE POLES

6' PIKE POLE (2)

There will be two (2) 6 ft. Fire Hooks Unlimited New York Roof Hook with Pry end. The pike pole(s) will be stored in tubular holders located in the ground ladder storage compartment.

8' PIKE POLE (1)

There will be one (1) 8 ft. Fire Hooks Unlimited Dry Wall Hook with Pry end. The pike pole(s) will be stored in tubular holders located in the ground ladder storage compartment.

8' PIKE POLE (1)

There will be one (1) 8 ft. Fire Hooks Unlimited Boston Rake with Pry end. The pike pole(s) will be stored in tubular holders located in the ground ladder storage compartment.

PIKE POLE STORAGE IN TORQUE BOX/LADDER STORAGE

There will be two (2) additional tubular holders for customer supplied hooks. (1) 10' and (1) 12' ABS tubing provided in the torque box/ladder storage area for a total of six (6) pike poles. If the head of a pike pole can come into contact with a painted surface, a stainless steel scuff plates will be provided.

MIDSHIP FIRE PUMP

Mid-ship fire pump will be a Waterous S100, 2,000 gpm single (1) stage mid-ship mounted centrifugal type. Pump will be the class "A" type.

Pump will deliver the percentage of rated discharges at the pressures indicated below:

- 100% of rated capacity at 150 psi net pump pressure.
- 100% of rated capacity at 165 psi net pump pressure.
- 70% of rated capacity at 200 psi net pump pressure.
- 50% of rated capacity at 250 psi net pump pressure.

Entire pump and both suction and discharge passages will be hydrostatically tested to a pressure of 600 psi (40.8 bar).

Pump will be fully tested at the pump manufacturer's factory to the performance requirements outlined in the current NFPA 1901 standards and will be free from objectionable pulsation and vibration.

Pump body and related parts will be of fine grain, alloy cast iron with a minimum tensile strength of 30,000 psi (2041.2 bar).

All moving parts in contact with water will be of high quality bronze or stainless steel.

MECHANICAL SEAL ON PUMP

Pump will be equipped with a self-adjusting, maintenance-free, mechanical shaft seal.

The mechanical seal will consist of a flat, highly polished, spring fed carbon ring that rotates with the impeller shaft. The carbon ring will press against a highly polished stainless steel stationary ring that is sealed within the pump body.

In addition, a throttling ring will be pressed into the steel chamber cover, providing a very small clearance around the rotating shaft in the event of a mechanical seal failure. The pump performance will not deteriorate, nor will the pump lose prime, while drafting if the seal fails during pump operation.

Wear rings will be bronze and easily replaceable to restore original pump efficiency and eliminate the need to replace the entire pump casing due to wear.

PUMP TRANSMISSION

Pump transmission will be made of a three (3) piece, high tensile aluminum, horizontally split casing.

Power transfer to pump will be through a passive lubricated, Morse HY-VO drive chain.

Drive shafts will be a minimum of 2.35" diameter hardened and ground alloy steel. All shafts will be ball bearing supported. The case will be designed as to eliminate the need for water cooling.

PUMPING MODE

An interlock system will be provided to ensure that the pump drive system components are properly engaged so that the apparatus can be safely operated. The interlock system will be designed to allow stationary pumping only.

AIR PUMP SHIFT

Pump shift engagement will be made by a two (2) position sliding collar, actuated pneumatically (by air pressure), with a three (3) position air control switch located in the cab. A manual back-up shift control will also be located on the left side pump panel.

Two (2) indicator lights will be provided adjacent to the pump shift inside the cab. One (1) green light will indicate the pump shift has been completed and be labeled "pump engaged". The second green light will indicate when the pump has been engaged, and that the chassis transmission is in pump gear. This indicator light will be labeled "OK to pump".

Another green indicator light will be installed adjacent to the hand throttle on the pump panel and indicate either the pump is engaged and the road transmission is in pump gear, or the road transmission is in neutral and the pump is not engaged. This indicator light will be labeled "Warning: Do not open throttle unless light is on".

The pump shift will be interlocked to prevent the pump from being shifted out of gear when the chassis transmission is in gear to meet NFPA requirements.

The pump shift control in the cab will be illuminated to meet NFPA requirements.

TRANSMISSION LOCK-UP

The direct gear transmission lock-up for the fire pump operation will engage automatically when the pump shift control in the cab is activated.

AUXILIARY COOLING SYSTEM

A supplementary heat exchange cooling system will be provided to allow the use of water from the discharge side of the pump for cooling the engine water. The heat exchanger will be cylindrical type and will be a separate unit. The heat exchanger will be installed in the pump or engine compartment with the control located on the pump operator's control panel. Exchanger will be plumbed to the master drain valve.

INTAKE RELIEF VALVE - PUMP

There will be One (1) Elkhart Style 40 relief valve(s) installed on the suction side of the pump preset at 125 psig. The relief valve(s) will have a working range of 75 psi to 250 psi.

The outlet will terminate below the frame rails with a 2.50" National Standard hose thread adapter and will have a "do not cap" warning tag.

The relief valve pressure control will be located behind the right side pump panel with a stainless steel access door.

WATER PRESSURE CONTROL MECHANISM

1. The pump shall be equipped with an automatic pressure control device.
2. A variable Relief Valve System, as required by **NFPA 1901** Standards, shall be provided to prevent undue pressure rise. This system monitors discharge and suction pressures through single panel mounted control valve.

THROTTLE CONTROL

Provide a FRC Throttle Xcel hand throttle with micrometer adjustment and quick release button.

PRIMING PUMP

The priming pump will be a Trident Emergency Products compressed air powered, high efficiency, multistage venturi based AirPrime System, conforming to standards outlined in the current edition of NFPA 1901.

All wetted metallic parts of the priming system are to be of brass and stainless steel construction. One (1) priming control will open the priming valve and start the pump primer.

PUMP MANUALS

There will be a total of two (2) pump manuals provided by the pump manufacturer and furnished with the apparatus. The manuals will be provided by the pump manufacturer in the form of two (2) electronic copies. Each manual will cover pump operation, maintenance, and parts.

PLUMBING, STAINLESS STEEL AND HOSE

All inlet and outlet lines will be plumbed with either stainless steel pipe, flexible polypropylene tubing or synthetic rubber hose reinforced with hi-tensile polyester braid. All hose's will be equipped with brass or stainless steel couplings. All stainless steel hard plumbing will be a minimum of a schedule 10 wall thickness.

Where vibration or chassis flexing may damage or loosen piping or where a coupling is required for servicing, the piping will be equipped with victaulic or rubber couplings.

Plumbing manifold bodies will be ductile cast iron or stainless steel.

All piping lines are to be drained through a master drain valve or will be equipped with individual drain valves. All drain lines will be extended with a hose to drain below the chassis frame.

All water carrying gauge lines will be of flexible polypropylene tubing.

All piping, hose and fittings will have a minimum of a 500 PSI hydrodynamic pressure rating.

MAIN PUMP INLETS

Two (2) 6.00" pump inlets will be provided on the right side of the vehicle.

The suction inlets will include removable zinc screens that are designed to provide cathodic protection for the pump, thus reducing corrosion in the pump.

INTAKE RELIEF VALVES

Provide (2) Two (1) each side, Akron Brass model 7982 "Revolution Intake Valve" with (Swivel Elbow Inlet) for the main pump inlets 6" X 5" storz.

MAIN PUMP INLET CAP

The main pump inlets will have National Standard Threads with a long handle chrome cap.

VALVES

All ball valves will be Akron® Brass. The Akron valves will be the 8000 series heavy-duty style with a stainless steel ball and a simple two-seat design. No lubrication or regular maintenance is required on the valve. Valves will have a **ten (10) year** warranty.

LEFT SIDE INLET

There will be one (1) auxiliary inlet with a 2.50" valve at the left side pump panel, terminating with a 2.50" (F) National Standard hose thread adapter.

The auxiliary inlet will be provided with a strainer, chrome swivel and plug.

The location of the valve for the one (1) inlet will be recessed behind the pump panel.

INLET CONTROL

The side auxiliary inlet(s) will incorporate a quarter-turn ball valve with the control located at the inlet valve. The valve operating mechanism will indicate the position of the valve.

INLET BLEEDER VALVE

A 0.75" bleeder valve will be provided for each side gated inlet. The valves will be located behind the panel with a swing style handle control extended to the outside of the panel. The handles will be chrome plated and provide a visual indication of valve position. The swing handle will provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage. The water discharged by the bleeders will be routed below the chassis frame rails.

TANK TO PUMP

The booster tank will be connected to the intake side of the pump with heavy duty piping and a quarter turn 3.00" full flow line valve with the control remotely located at the operator's panel. Tank to pump line will run from the pump into the front face of the water tank and angle down into the tank sump. A rubber coupling will be included in this line to prevent damage from vibration or chassis flexing.

A check valve will be provided in the tank to pump supply line to prevent the possibility of "back filling" the water tank.

TANK REFILL

A 1.50" combination tank refill and pump re-circulation line will be provided, using a quarter-turn full flow ball valve controlled from the pump operator's panel.

LEFT SIDE DISCHARGE OUTLETS

There will be two (2) discharge outlets with a 2.50" valve on the left side of the apparatus, terminating with a 2.50" (M) National Standard hose thread adapter.

RIGHT SIDE DISCHARGE OUTLETS

There will be one (1) discharge outlet with a 2.50" valve on the right side of the apparatus, terminating with a 2.50" (M) National Standard hose thread adapter.

LARGE DIAMETER DISCHARGE OUTLET

There will be a 4.00" discharge outlet with a 4.00" Akron valve installed on the right side of the apparatus, terminating with a 4.00" 30 degree NST X 5" storz, with 5" storz cap and chain. This discharge outlet will be actuated with an Akron 8630 small hand wheel control at the pump operator's control panel.

An indicator will be provided to show when the valve is in the closed position.

DISCHARGE CAPS/ INLET PLUGS

Chrome plated, rocker lug, caps with chain will be furnished for all discharge outlets 1.00" thru 3.00" in size, besides the pre-connected hose outlets.

Chrome plated, rocker lug, plugs with chain will be furnished for all auxiliary inlets 1.00" thru 3.00" in size. The caps and plugs will incorporate a thread design to automatically relieve stored pressure in the line when disconnected (no exception).

OUTLET BLEEDER VALVE

A 0.75" bleeder valve will be provided for each outlet 1.50" or larger. Automatic drain valves are acceptable with some outlets if deemed appropriate with the application.

The valves will be located behind the panel with a swing style handle control extended to the outside of the side pump panel. The handles will be chrome plated and provide a visual indication of valve position. The swing handle will provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage. Bleeders will be located at the bottom of the pump panel. They will be properly labeled identifying the discharge they are plumbed in to. The water discharged by the bleeders will be routed below the chassis frame rails.

LEFT SIDE OUTLET ELBOWS

The 2.50" discharge outlets located on the left side pump panel will be furnished with a 2.50" (F) National Standard hose thread x 2.50" (M) National Standard hose thread, chrome plated, 45 degree elbow and 2 ½" X 1 ½" reducers, caps and retaining chains.

RIGHT SIDE OUTLET ELBOWS

The 2.50" discharge outlets located on the right side pump panel will be furnished with a 2.50" (F) National Standard hose thread x 2.50" (M) National Standard hose thread, chrome plated, 45 degree elbow and 2 ½" X 1 ½" reducers, caps and retaining chains.

LARGE DIAMETER OUTLET ELBOWS

The 4.00" outlet(s) will be furnished with one (1) 4.00" (F) National Standard hose thread x 5.00" Storz elbow adapter with Storz cap.

APPARATUS VALVES

The main pump discharges and all 1" or larger in-line, suction and discharge valves will be full flow, gear actuated swing out style, to simplify servicing. Valves controls shall be Akron 8630 position indicating for gear actuated swing out valves.

AERIAL OUTLET AKRON 8630

The aerial waterway will be plumbed from the pump to the water tower line with 5.00" pipe and a 4.00" Akron 8630 position indicator for gear actuated swings-out valves shall be provided. The Akron 8630 small hand wheel control for the waterway valve will be located at the pump operator's panel. An indicator will be provided to show the position of the valve.

CROSSLAY HOSE BEDS

Two (2) cross lays with 1.50" outlets will be provided. Each bed to be capable of carrying 200 feet of 1.75" double jacketed hose and will be plumbed with 2.00" i.d. pipe and gated with a 2.00" full flow gear operated swing out ball valve. Akron 8630 position indicator for gear actuated swings-out valves shall be provided. Outlets to be equipped with a 1.50" National Standard hose thread 90 degree swivel located so that hose may be removed from either side of apparatus.

The cross lay controls will be at the pump operator's panel.

A removable tray will be provided for each cross lay hose bed. The cross lay trays will be constructed of black poly to provide a lightweight sturdy tray. Two (2) hand holes will be in the floor and additional hand holes will be provided in the sides for easy removal and installation from the compartment. The floor of the trays will be perforated to allow for drainage and hose drying. The bottom of the cross lay compartments will be lined with stainless steel to allow the tray to slide with ease. Scuff plates will be provided on both sides, at the sides and bottom of each opening to protect the paint.

CROSSLAY/DEADLAY HOSE RESTRAINT

- The ends of the cross lays will be restrained with black webbing that will have 1.00" webbing straps that loop and fasten with spring clip and hook fasteners.

PUMP COMPARTMENT

The pump compartment will be separate from the hose body and compartments so that each may flex independently of the other. The pump compartment will be constructed of the same material as the body compartmentation.

The pump compartment substructure will be a fabricated assembly of steel tubing, angles and channels which supports both the fire pump and the side running boards.

The pump compartment will be mounted on the chassis frame rails with rubber biscuits in a four point pattern to allow for chassis frame twist.

Pump compartment, pump, plumbing and gauge panels will be removable from the chassis in a single assembly.

PUMP MOUNTING

Pump will be mounted to a substructure which will be mounted to the chassis frame rail using rubber isolators. The mounting will allow chassis frame rails to flex independently without damage to the fire pump.

LEFT SIDE PUMP CONTROL PANELS

All pump controls and gauges will be located at the left side of the apparatus and properly identified.

Layout of the pump control panel will be ergonomically efficient and systematically organized.

The pump operator's control panel will be removable in two (2) main sections for ease of maintenance:

The upper section will contain sub panels for the mounting of the pump pressure control device, engine monitoring gauges, electrical switches. Sub panels will be removable from the face of the pump panel for ease of maintenance. Below the sub panels will be located all valve controls and line pressure gauges.

The lower section of the panel will contain all inlets, outlets, and drains.

Valve controls shall be Akron 8630 position indicating for gear actuated swing out valves.

IDENTIFICATION TAGS

The identification tag for each valve control will be recessed in the face of the tee handle.

All discharge outlets will have color coded identification tags, with each discharge having its own unique color. Color coding will include the labeling of the outlet and the drain for each corresponding discharge.

All line pressure gauges will be mounted directly above the corresponding discharge control tee handles and recessed within the same chrome plated casting as the rod guide for quick identification. The gauge and rod guide casting will be removable from the face of the pump panel for ease of maintenance. The casting will be color coded to correspond with the discharge identification tag.

All remaining identification tags will be mounted on the pump panel in chrome plated bezels.

Trim rings will be installed around all inlets and outlets.

PUMP PANEL CONFIGURATION

The pump panel configuration will be arranged and installed in an organized manner that will provide user-friendly operation.

AKRON GEAR ACTUATED SWING OUT VALVES AND CONTROLS

Discharge valves shall be Akron gear actuated swing out valves. These valves shall be controlled by an Akron 8630 rotary control position indicator for gear actuated valves assembly.

PUMP OPERATOR'S PLATFORM

A pull out, flip down platform will be provided at the pump operator's control panel.

The front edge and the top surface of the platform will be made of DA finished aluminum with a Morton Cass insert.

The platform will be approximately 13.75" deep when in the stowed position and approximately 22.00" deep when extended. The platform stepping surface will be 28.00" wide. The platform will lock in the retracted and the extended position.

The platform will be wired to the "step not stowed" indicator in the cab.

PUMP OPERATOR'S PLATFORM PERIMETER LIGHT

There will be an On Scene Solutions, Model Night Stick Access, 20.00" white 12 volt DC LED strip light provided to illuminate the ground area.

PUMP AND GAUGE PANEL

The pump and gauge panels will be constructed of aluminum with a black vinyl finish. A polished aluminum trim molding will be provided around each panel.

The right side pump panel will be removable and fastened with recessed chrome plated lift and turn type fasteners.

PUMP COMPARTMENT LIGHT

There will be one (1) Whelen®, Model 3SC0CDCR, 3.00" white 12 volt DC LED light(s) with Whelen, Model 3FLANGEC, flange(s) installed in the pump compartment.

There will be a switch accessible through a door on the pump panel included with this installation.

Engine monitoring graduated LED indicators will be incorporated with the pressure controller.

OK TO PUMP INDICATOR LIGHT

There will be a green indicator light installed on the pump operator's panel that is activated when the pump is in Ok to Pump mode.

VACUUM AND PRESSURE GAUGES

The pump vacuum and pressure gauges will be liquid filled and manufactured by Class 1 Incorporated ©. The gauges will be a minimum of 4.00" in diameter and will have white faces with black lettering, with a pressure range of 30.00"-0-600#.

Gauge construction will include a Zytel nylon case with adhesive mounting gasket and threaded retaining nut.

The pump pressure and vacuum gauges will be installed adjacent to each other at the pump operator's control panel.

Test port connections will be provided at the pump operator's panel. One will be connected to the intake side of the pump, and the other to the discharge manifold of the pump. They will have 0.25 in. standard pipe thread connections and non-corrosive polished stainless steel or brass plugs. They will be marked with a label.

This gauge will include a 10 year warranty against leakage, pointer defect, and defective bourdon tube.

PRESSURE GAUGES

The individual "line" pressure gauges for the discharges will be Class 1© inter-lube filled. They will be a minimum of 2.00" in diameter and have white faces with black lettering. Gauge construction will include a Zytel nylon case with adhesive mounting gasket and threaded retaining nut.

Gauges will have a pressure range of 30"-0-400#.

The individual pressure gauge will be installed as close to the outlet control as practical.

This gauge will include a 10 year warranty against leakage, pointer defect, and defective bourdon tube.

WATER LEVEL GAUGE

An electric water level gauge will be incorporated in the pressure controller that registers water level by means of 9 LEDs. They will be at 1/8 level increments with a tank empty LED. The LEDs will be a bright type that is readable in sunlight, and have a full 180-degree of clear viewing.

To further alert the pump operator, the gauge will have a warning flash when the tank volume is less than 25%, and will have "Down Chasing LEDs when the tank is almost empty.

The level measurement will be ascertained by sensing the head pressure of the fluid in the tank or cell.

PUMP PANEL ILLUMINATION

There will be a stainless steel light shield installed over the pump operator's panel. This shield will include three (3) 12 volt DC white LED lights to illuminate the controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus. These lights will be activated by the pump panel light switch.

There will be two (2) 12 volt DC white LED lights to illuminate the pump panel under the pump operator's panel. These lights will be activated by the same switch as the lights over the pump operator's panel.

There will be one (1) 12 volt DC white LED light to illuminate the pump panel under the pump operator's panel. This light will be activated when the pump is in "Ok to Pump" mode.

There will be a light activated above the pump panel light switch when the parking brake is set. This is to afford the operator some illumination when first approaching the control panel.

ADDITIONAL LIGHT SHIELD

An additional step/light shield will be provided above passenger's side pump panel. The pump panel will be illuminated by three (3) LED lights installed under a bright aluminum tread plate step.

The step will have a minimum of a 13.00" stepping surface and it will be properly reinforced to support a man's weight.

The lights will be operated from a switch on the pump panel.

AIR HORN SYSTEM

One (1) Grover 1510 air horn or equal shall be installed on the apparatus. The sounding unit shall be die cast and easily separated for service. The solenoid air valve shall be a skinner V-5 or equal. The horn shall be mounted behind the cutout in the front bumper. A linemaster #632S foot switch or equal on the driver's side will control the air horn, in addition a push button shall be provided and accessible from the officer seat. Provide a manual shutoff valve to the horn air switch.

PUMP PANEL AIR HORN BUTTON

Provide a single push button switch on the pump operator's panel to activate the air horn.

ELECTRONIC SIREN

A Whelen®, Model 295SLSA1, electronic siren with noise canceling microphone will be provided.

This siren to be active when the battery switch is on and that emergency master switch is on.

Electronic siren head will be recessed in the driver side center switch panel.

The electronic siren will be controlled on the siren head only. No horn button or foot switches will be provided.

SPEAKER

There will be one (1) Whelen®, Model **SA122FMP**, black nylon composite, 100-watt, speaker with through bumper mounting brackets and polished stainless steel grille provided. The speaker will be connected to the siren amplifier.

The speaker(s) will be recessed in the center of the front bumper.

AUXILIARY MECHANICAL SIREN

A Federal Q2B® siren will be furnished. A siren brake button will be installed on the switch panel.

The control solenoid will be powered up after the emergency master switch is activated.

The mechanical siren will be mounted on the front grille, partially recessed. The motor will be mounted behind the front grille and will include a reinforcement plate for mounting.

The mechanical siren will be actuated utilizing the center horn ring. The driver will have the option to control the 2QB or the chassis horns from the horn button by means of a selector switch located on the instrument panel.

FRONT ZONE UPPER WARNING LIGHTS

Whelen Freedom® IV Rota-Beam™ Super-LED Model F4R7RRRR light bar red and white with clear lens are to be mounted on the cab roof. As required by NFPA Pamphlet #1901, the white sections will automatically turn off when in the blocking right-of-way mode. Pre wired for GTT Opticom F4R795H

GTT OPTICOM

Provide a GTT 795H Opti-com system installed in roof light bar as detailed in "NFPA Lighting Package" section.

SIDE UPPER WARNING LIGHTS

Two (2) (23") twenty three inch Whelen Mini Freedom® IV Rota-Beam™ Super-LED red with white Rota-Beam center side facing only and clear lens on light bars to be mounted on the cab roof over the rear entry doors (1) each side). As required by NFPA Pamphlet #1901, the white sections will automatically turn off when in the blocking right-of-way mode.

CAB FACE WARNING LIGHTS

There will be four (4) Whelen®, Model M6*C, LED flashing warning lights installed on the cab face, above the headlights, mounted in a common bezel.

- The driver's side front outside warning light to be red
- The driver's side front inside warning light to be red
- The passenger's side front inside warning light to be red
- The passenger's side front outside warning light to be red

All four (4) lights will include a clear lens.

There will be a switch located in the cab, on the switch panel, to control the four (4) lights.

The inside lights may be load managed if colored or disabled if white, when the parking brake is set.

ROTO-RAY 4000W

Provide one (1) Roto-Ray 4000W with chrome housing to be mounted center of cab just above the grill and below the windshield. Color shall be Red, Red, and White with clear lenses.

HEADLIGHT FLASHER

The high beam headlights will flash alternately between the left and right side.

There will be a switch installed in the cab on the switch panel to control the high beam flash. This switch will be live when the battery switch and the emergency master switches are on.

The flashing will automatically cancel when the hi-beam headlight switch is activated or when the parking brake is set.

SIDE ZONE LOWER LIGHTING

There will be four (4) Whelen®, Model M6V2RC, flashing LED warning lights with chrome trim installed per the following:

- Two (2) lights, one (1) each side on the bumper extension. The side front lights to be red.
- Two (2) lights, one (1) each side above rear wheels. The side rear lights to be red.
- The lights will include a clear lenses.

There will be a switch in the cab on the switch panel to control the lights.

REAR ZONE LOWER LIGHTING

There shall be two (2) Whelen®, Model M6V2RC LED flashing warning lights located at the rear of the apparatus.

- The driver's side rear light to be red
- The passenger's side rear light to be red

Both lights will include a lens that is clear.

There will be a switch located in the cab on the switch panel to control the lights.

REAR/SIDE ZONE UPPER WARNING LIGHTS

There will be two (2) Whelen®, Two (2) (23") twenty three inch Whelen Mini Freedom® IV Rota-Beam™ Super-LED red and amber with clear lens at the rear of the truck, located one (1) each side. There will be a switch located in the cab on the switch panel to control the beacons.

TRAFFIC DIRECTING LIGHT

There will be one (1) Whelen®, Model TAL65, 36.00" long x 2.87" high x 2.25" deep, amber LED traffic directing light installed at the rear of the apparatus.

The Whelen, Model TACTL5, control head will be included with this installation.

The controller shall be energized when the battery switch is on.

The auxiliary flash not activated.

This traffic directing light will be mounted on top of the body below the turntable with a treadplate box at the rear of the apparatus.

The traffic directing light control head will be located in the driver side overhead switch panel in the right panel position.

ELECTRICAL SYSTEM GENERAL DESIGN FOR ALTERNATING CURRENT

The following guidelines will apply to the 120/240 VAC system installation:

GENERAL

Any fixed line voltage power source producing alternating current (ac) line voltage will produce electric power at 60 cycles plus or minus 3 cycles.

Except where superseded by the requirements of NFPA 1901, all components, equipment and installation procedures will conform to NFPA 70, National Electrical Code (herein referred to as the NEC).

Line voltage electrical system equipment and materials included on the apparatus will be listed and installed in accordance with the manufacturer's instructions. All products will be used only in the manner for which they have been listed.

GROUNDING

Grounding will be in accordance with Section 250-6 "Portable and Vehicle Mounted Generators" of the NEC. Ungrounded systems will not be used. Only stranded or braided copper conductors will be used for grounding and bonding.

An equipment grounding means will be provided in accordance with Section 250-91 (Grounding Conductor Material) of the NEC.

The grounded current carrying conductor (neutral) will be insulated from the equipment grounding conductors and from the equipment enclosures and other grounded parts. The neutral conductor will be colored white or gray in accordance with Section 200-6 (Means of Identifying Grounding Conductors) of the NEC.

In addition to the bonding required for the low voltage return current, each body and driving or crew compartment enclosure will be bonded to the vehicle frame by a copper conductor. This conductor will have a minimum amperage rating of 115 percent of the nameplate current rating of the power source specification label as defined in Section 310-15 (amp capacities) of the NEC. A single conductor properly sized to meet the low voltage and line voltage requirements will be permitted to be used.

All power source system mechanical and electrical components will be sized to support the continuous duty nameplate rating of the power source.

OPERATION

Instructions that provide the operator with the essential power source operating instructions, including the power-up and power-down sequence, will be permanently attached to the apparatus at any point where such operations can take place.

Provisions will be made for quickly and easily placing the power source into operation. The control will be marked to indicate when it is correctly positioned for power source operation. Any control device used in the drive train will be equipped with a means to prevent the unintentional movement of the control device from its set position.

A power source specification label will be permanently attached to the apparatus near the operator's control station. The label will provide the operator with the following information:

- Rated voltage(s) and type (ac or dc)
- Phase
- Rated frequency
- Rated amperage
- Continuous rated watts
- Power source engine speed

Direct drive (PTO) and portable generator installations will comply with Article 445 (Generators) of the NEC.

OVERCURRENT PROTECTION

The conductors used in the power supply assembly between the output terminals of the power source and the main over current protection device will not exceed 144.00" (3658 mm) in length.

For fixed power supplies, all conductors in the power supply assembly will be type THHW, THW, or use stranded conductors enclosed in nonmetallic liquid tight flexible conduit rated for a minimum of 194 degree Fahrenheit (90 degrees Celsius).

For portable power supplies, conductors located between the power source and the line side of the main overcurrent protection device will be type SO or type SEO with suffix WA flexible cord rated for 600-volts at 194 degrees Fahrenheit (90 degrees Celsius).

WIRING METHODS

Fixed wiring systems will be limited to the following:

- Metallic or nonmetallic liquid tight flexible conduit rated at not less than 194 degrees Fahrenheit (90 degrees Celsius)
- or
- Type SO or Type SEO cord with a WA suffix, rated at 600 volts at not less than 194 degrees Fahrenheit (90 degrees Celsius)

Electrical cord or conduit will not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components, or low voltage wiring. In addition the wiring will be run as follows.

- Separated by a minimum of 12.00" (305 mm), or properly shielded, from exhaust piping
- Separated from fuel lines by a minimum of 6.00" (152 mm) distance

Electrical cord or conduit will be supported within 6.00" (152 mm) of any junction box and at a minimum of every 24.00" (610 mm) of continuous run. Supports will be made of nonmetallic materials or corrosion protected metal. All supports will be of a design that does not cut or abrade the conduit or cable and will be mechanically fastened to the vehicle.

WIRING IDENTIFICATION

All line voltage conductors located in the main panel board will be individually and permanently identified. The identification will reference the wiring schematic or indicate the final termination point. When prewiring for future power sources or devices, the unterminated ends will be labeled showing function and wire size.

WET LOCATIONS

All wet location receptacle outlets and inlet devices, including those on hardwired remote power distribution boxes, will be of the grounding type provided with a wet location cover and installed in accordance with Section 210-7 "Receptacles and Cord Connections" of the NEC.

All receptacles located in a wet location will be not less than 24.00" (610 mm) from the ground.

Receptacles on off-road vehicles will be a minimum of 30.00" (762 mm) from the ground.

The face of any wet location receptacle will be installed in a plane from vertical to not more than 45 degrees off vertical. No receptacle will be installed in a face up position.

DRY LOCATIONS

All receptacles located in a dry location will be of the grounding type. Receptacles will be not less than 30.00" (762 mm) above the interior floor height.

All receptacles will be marked with the type of line voltage (120-volts or 240-volts) and the current rating in amps. If the receptacles are direct current, or other than single phase, they will be so marked.

LISTING

All receptacles and electrical inlet devices will be listed to UL 498, Standard for Safety Attachment Plugs and Receptacles, or other appropriate performance standards. Receptacles used for direct current voltages will be rated for the appropriate service.

ELECTRICAL SYSTEM TESTING

The wiring and associated equipment will be tested by the apparatus manufacturer or the installer of the line voltage system.

The wiring and permanently connected devices and equipment will be subjected to a dielectric voltage withstand test of 900-volts for one (1) minute. The test will be conducted between live parts and the neutral conductor, and between live parts and the vehicle frame with any switches in the circuit(s) closed. This test will be conducted after all body work has been completed.

Electrical polarity verification will be made of all permanently wired equipment and receptacles to determine that connections have been properly made.

OPERATIONAL TEST PER CURRENT NFPA 1901 STANDARD

The apparatus manufacturer will perform the following operation test and ensure that the power source and any devices that are attached to the line voltage electrical system are properly connected and in working order. The test will be witnessed and the results certified by an independent third-party certification organization.

The prime mover will be started from a cold start condition and the line voltage electrical system loaded to 100 percent of the nameplate rating.

The power source will be operated at 100 percent of its nameplate voltage for a minimum of two (2) hours unless the system meets category certification as defined in the current NFPA 1901 standard.

Where the line voltage power is derived from the vehicle's low voltage system, the minimum continuous electrical load as defined in the current NFPA 1901 standard will be applied to the low voltage electrical system during the operational test.

GENERATOR

The apparatus will be equipped with a complete AC (alternating current) electrical power system. The generator will be a Harrison Model MID 8.0, 8,000 watt hydraulic driven unit.

The generator will be driven by a transmission power take off unit, through a hydraulic pump and motor.

The hydraulic engagement supply will be operational only after the chassis parking brake is applied.

An electric/hydraulic valve will supply hydraulic fluid to the clutch engagement unit provided on the chassis PTO drive.

GENERATOR INSTRUMENTS AND CONTROLS

To properly monitor the generator performance a digital meter panel will be furnished and mounted near the circuit breaker panel.

GENERATOR LOCATION

The generator will be installed below the ladder storage in the rear compartment. Proper ventilation will be provided for generator operation. A removable cover will be provided over the rear of the generator. There will be open access to the hydraulic reservoir fill.

GENERATOR START

There will be a switch provided on the cab instrument panel to engage the generator.

CIRCUIT BREAKER PANEL

The circuit breaker panel will be located in the compartment above the left side front stabilizer.

ELECTRIC CORD REEL

Furnished with the 120 volt AC electrical system will be a Hannay, Series 1600, cord reel. The reel will be provided with a 12-volt electric rewind switch, that is guarded to prevent accidental operation and labeled for its intended use. The switch will be protected with a fuse and installed at a height not to exceed 72.00" above the operators standing position.

The exterior finish of the reel(s) will be painted #269 gray from the reel manufacturer.

A captive roller assembly to be provided to aid in the payout and loading of the reel. A ball stop will be provided to prevent the cord from being wound on the reel.

A label will be provided in a readily visible location adjacent to the reel. The label will indicate current rating, current type, phase, voltage and total cable length.

A total of one (1) cord reel will be provided *** **(location TBD at preconstruction)**.

The cord reel will be configured with three (3) conductors.

CABLE ROLLERS:

There shall be a set of cable rollers installed on the apparatus. The rollers will be used on reels, or on cabinet door openings, where sharp edges may cut or damage cables.

CORD

Provided for electric distribution will be one (1) length installed on the reel of 200 feet of yellow 10/3 electrical cord, weather resistant 105 degree C to -50 degree C, 600 volt jacketed SOOW cord. A Hubbell L5-20, 20 amp, 120 volt, twist lock connector body will be installed on the end of the cord.

4-WAY JUNCTION BOX

There shall be a high visibility yellow direct wire Circle D model P51-G 7 four-way junction box with one (1) 120-volt 20-amp twist lock and three (3) 120-volt 15-amp twist lock receptacles provided. The box shall have an integral 112-volt light and be hardwired to the cord reel. A junction box storage bracket shall be provided.

GENERAL INFORMATION

It is the intent of these specifications to describe a mid-mounted telescoping, elevating platform. The unit will consist of a five (5) section, steel ladder with a self-leveling basket attached to the ladder fly section.

OPERATION ON GRADES

The aerial unit will be capable of operating safely, on any slope up to 10 degrees at full capacities.

CONSTRUCTION STANDARDS

The ladder will be constructed to meet all of the requirements as described in the current edition of NFPA 1901.

These capabilities will be established in an unsupported configuration.

All structural load supporting elements of the aerial device that are made of a ductile material will have a design stress of not more than 50% of the minimum yield strength of the material based on the combination of the live load and the dead load. This 2:1 structural safety factor meets the current NFPA 1901 standard.

All structural load supporting elements of the aerial device that are made of non-ductile material will have a design stress of not more than 20% of the minimum ultimate strength of the material, based on the combination of the rated capacity and the dead load. This 5:1 safety factor meets the current 1901 NFPA standard.

The aerial device will be capable of sustaining a static load one and one-half times its rated tip load capacity (live load) in every position in which the aerial device can be placed when the vehicle is on a firm level surface.

The aerial device will be capable of sustaining a static load one and one-third times its rated tip load capacity (live load) in every position the aerial device can be placed when the vehicle is on a slope of five degrees downward in the direction most likely to cause overturning.

With the aerial device out of the cradle in the in the fully extended position at zero degrees elevation, a test load will be applied in a horizontal direction normal to the centerline of the ladder. The turntable will not rotate and the ladder will not deflect beyond what the product specification allows.

All welding will be in compliance with the American Welding Society standards. All welding personnel will be certified, as qualified under AWS welding codes.

The aerial device will be capable of operating in either of the two (2) following conditions:

- Conditions of high wind up to 35 mph
- Conditions of icing, up to a coating of .25" over the entire aerial structure

All of the design criteria must be supported by the following test data:

- Strain gage testing of the complete aerial device

The following criteria for materials are to be used in the design of the aerial device:

- Materials are to be certified by the mill that manufactured the material
- Material testing that is performed after the mill test will be for verification only and not with the intent of changing the classification.

LADDER CONSTRUCTION

The ladder will be comprised of five (5) sections and will extend to a nominal height, of 100' above the ground, as measured by 1901 recommendations. The ladder (handrails, baserails, trusses, k-braces and rungs) will be constructed of welded, high strength steel certified by the manufacturer as being a minimum of 100,000 pounds per square inch of yield strength. All critical points will be reinforced, for extra rigidity, and to provide a high strength-to-weight ratio. Ladder rungs will be round and welded to each section in two (2) places with "K" bracing for torsional rigidity. A minimum of 70.25" of overlap between each of the aerial sections will be provided.

The inside width dimensions of the ladder will be:

- Base Section 56.12"
- Lower Mid Section 46.12"
- Center Mid Section 36.62"
- Upper Mid Section 28.12"
- Fly Section 22.12"

The height of the handrails above the centerline of the rungs will be:

- Base Section 40.72"
- Lower Mid Section 39.08"
- Center Mid Section 32.32"
- Upper Mid Section 29.02"
- Fly Section 26.37"

VERTICAL HEIGHT

The height of the unit will extend to no less than 100', as measured by a plumb line from the top surface of the basket handrail assembly to the ground, with the basket raised to a 77 degree angle.

HORIZONTAL REACH

The rated horizontal reach will be 93'. The measurement of horizontal reach will be consistent with NFPA standards.

MOUNTING OF ELEVATING PLATFORM

The aerial device will be mid mounted, to a torque box, on the truck chassis.

TORQUE BOX

A "torsion box" subframe will be installed between two sets of stabilizers. The torque box will be constructed of 100,000 pounds per square inch yield steel with an integral ladder storage box. The torque box assembly will be capable of withstanding all torsional and horizontal loads when the unit is on the stabilizers. The torque box will be bolted to the chassis frame rails using forty-eight .750" SAE grade 8 bolts with nuts.

TURNTABLE

The turntable will be coated with a non-skid, chemical resistant material in the walking areas. The stepping surfaces will meet the skid-resistance requirements in the current NFPA 1901 standard.

The turntable will serve as a step for access to the ladder.

The turntable handrails will be a minimum 42.00" high and will not increase the overall travel height of the vehicle. The handrails will be constructed from 1.62" diameter extruded 6061-T6 aluminum with a slip resistant knurled surface. The handrails will be anodized to resist corrosion.

ELEVATION SYSTEM

Two (2) double acting, lift cylinders will be utilized to provide smooth, precise elevation from 15 degrees below horizontal to 77 degrees above horizontal. The lift cylinder will be attached to each side of the base section. The lift cylinders will have a 7.50" internal diameter (bore), 3.50" diameter cylinder rod and a 53.89" stroke. The lift cylinder rod will be chrome plated, to provide smooth operation of the aerial and reduce seal wear. The lift cylinders will be equipped with integral holding valves located in the cylinder, to prevent the unit from descending should the charged lines be severed, at any point within the hydraulic system and to maintain the ladder in the bedded position during road travel. The integral holding valves will NOT be located in the transfer tubes.

The elevation system will be controlled by the microprocessor. The microprocessor will provide the following features:

- Collision avoidance of the elevation system to prevent accidental body damage
- Automatic deceleration when the aerial device is lowered into the cradle
- Automatic deceleration at the end of stroke, in maximum raise and lower positions
- Deceleration of the aerial device from 0 to -15 degrees

EXTENSION/RETRACTION SYSTEM

A hydraulically powered, extension and retraction system will be provided through dual hydraulic cylinders and wire ropes. The extension cylinder will have a 6.50" internal diameter (bore), 2.75" diameter rod and a 53.12" stroke. Each set will be capable of operating the ladder in the event of a failure, of the other. For safety, systems that use only a single extension/retraction system will not be acceptable. The extension cylinder rod will be chrome plated to provide smooth operation of the aerial device and reduce seal wear. The extension/retraction cylinders will be equipped, with integral holding valves, to prevent the unit from retracting should the charged line be severed, at any point within the hydraulic system. The integral holding valves will NOT be located in the transfer tubes.

Wire ropes and attaching systems used to extend and retract the fly sections will have a 5:1 safety factor based on the ultimate strength under all operating conditions. The factor of safety for the wire rope will remain above 2:1 during any extension or retraction stall. The minimum ratio of the diameter of wire rope used to the diameter of the sheave used will be 1:12. Wire ropes will be constructed of seven (7) strands over an inner wire core for increased flexibility. The wire rope will be galvanized to reduce corrosion. The extension/retraction system will be controlled by the microprocessor. The microprocessor will provide the following features:

- Automatic deceleration at the end of stroke, in maximum extend and retract positions
- Controls the rate of retraction while flowing water

All sheaves and sheave pins will utilize greasable bronze bushings. Sheave pins will be polished stainless steel.

ROTATION SYSTEM

A 54.00" diameter, external tooth, monorace rotation bearing will be used for the rotation system and will provide 360 degree continuous rotation. The turntable will be bolted to the bearing using 30 SAE grade 8, .875" diameter bolts. To secure the bearing to the base support, 36 grade 8, .875" diameter bolts will be used. The turntable base and the torque box bearing plate will be machined to fit the bearing, thereby providing even distribution of forces. Two (2) hydraulically driven, planetary gear boxes, with drive speed reducer, will be used to provide infinite and minute rotation control, throughout the entire rotational travel. Each planetary gearbox has a torque rating of 130,000 pounds per square inch. A spring applied, hydraulically released, disc type, swing brake will be furnished to provide positive braking of the turntable assembly. Provisions will be made for auxiliary operation of the rotation system should complete loss of normal hydraulic power occur.

The rotation system will be controlled by the microprocessor. The microprocessor will provide the following features:

- Envelope control of rotation system to prevent accidental body damage
- Prevent the aerial from being rotated into the short-jacked side of the unit

MANUAL OVERRIDE CONTROLS

Manual override controls will be provided for all aerial and stabilizer functions.

LADDER SLIDE MECHANISM

Wear pads will be used between the telescoping ladder sections, to reduce friction for smoother operation. Slide pads will also be used to control side play between the ladder sections.

BASKET LEVELING SYSTEM

A basket leveling system will be provided and so designed, that the basket with it's rated load, can be supported and maintained level, relative to the turntable, regardless of the elevation or flexion of the ladder. The leveling of the basket features a hydraulic cylinder system mounted between the ladder fly section and the basket with each side capable of supporting the load, while maintaining the basket level.

The hydraulic circuitry includes pressure operated counter balance valves, on the load side of the cylinders, to prevent the basket from tipping should the hydraulic lines be severed.

The microprocessor will control the level of the basket during bedding operations, preventing the basket from hitting the body deck when the truck is setup on unlevel ground.

ROTATION INTERLOCK

The microprocessor will be used to prevent the rotation of the aerial device, to the side in which the stabilizers have not been fully deployed (short-jacked). The microprocessor will allow full and unrestricted use of the aerial, in the 180 degree area, on the side(s) where the stabilizers have been fully deployed. The system will also have a manual override, to comply with NFPA 1901. SYSTEMS THAT PERMIT THE AERIAL TO ROTATE TO THE "SHORT JACK" SIDE, WITHOUT AUTOMATICALLY STOPPING THE ROTATION AND/OR WITHOUT ACTUATION OF THE "MANUAL OVERRIDE", will NOT BE ACCEPTED. SYSTEMS THAT ONLY INCLUDE AN ALARM ARE NOT CONSIDERED AN INTERLOCK AND will NOT BE ACCEPTED.

LOAD CAPACITIES

The following load capacities will be established with the stabilizers at full horizontal extension and placed in the down position to level the truck and to relieve the weight from the tires and axles. Capacities will be based upon full extension and 360 degree rotation.

A load chart, visible at the operator's station, will be provided. The load chart will show the recommended safe load at any condition of the aerial device's elevation and extension.

ELEVATION -15 TO 77 DEGREES

The aerial device will be able to maintain the above load capacities while flowing up to 1500 GPM and a nozzle position of 0 to 90 degrees to either side of the ladder centerline, and as far above and below horizontal to the platform as nozzle design allows.

The aerial device will be able to maintain the above load capacities while flowing up to 2000 GPM and a nozzle position of 0 to 45 degrees to either side of the ladder centerline, and 30 degrees above horizontal and as far below horizontal to the platform as nozzle design allows.

Reduced loads in the basket can be redistributed in 250 lb. Increments to the fly, mid, or base as needed.

LADDER CRADLE INTERLOCK SYSTEM

A ladder cradle interlock system will be provided through the microprocessor to prevent the lifting of the aerial device from the nested position until the operator places all the stabilizers in a load supporting configuration. A switch will be installed at the boom support to prevent operation of the stabilizers once the aerial has been elevated from the nested position.

AERIAL BOOM PANEL

There will be one boom panel provided on each side of the aerial ladder base section. The boom panel will be painted #10 white.

The boom panels will be designed so no mounting bolts are in the face of the panel. This will keep the lettering surface free of holes.

AERIAL DEVICE RUNG COVERS

Each rung will be covered with a secure, heavy-duty, fiberglass pultrusion that incorporates an aggressive, no-slip coating.

The rung covers will be glued to each rung, and will be easily replaceable should the rung cover become damaged.

The center portion of each rung cover will be black and the outside 2.00" edge at each side will be safety yellow.

Under no circumstances will the rung covers be fastened to the rungs using screws or rivets.

The rung covers will have a 10-year, limited warranty.

STABILITY TEST

An aerial stability test will be run on this apparatus using the maximum weight allowance for tip options.

LADDER STORAGE MOUNTING BRACKETS

There will be brackets that are DA finished provided near the end of the fly section of the aerial for mounting a roof ladder.

The mounting brackets will accommodate a 14' Duo-Safety 75-A-DR roof ladder as determined by the type of aerial device and the available space.

SAW STORAGE BOX

There will be a total of two (2) storage box(es) provided at the base section of the aerial ladder, one (1) on each side of the aerial device. The box(es) will be painted to match the aerial device and located at the tip of the base section. The box(es) will have a hinged cover with D-handle latch and two (2) gas struts to secure the saw. The cover will have the same finish as the box. The box will have no louvers.

The maximum capacity of each box will be 75 lb.

BASKET STRUCTURE

The complete basket structure will be constructed of welded high strength steel certified by the manufacturer to have a minimum of 100,000 lb per square inch yield strength on all structural members. The aerial basket will be fully tested and independent third party certified.

The flooring of the basket will be multi-piece Morton Cass material, preventing the accumulation of water on the standing surface. The floor will measure approximately 33.63" long x 72.75" wide. The stepping surfaces will meet the skid-resistance requirements of current NFPA 1901 standard.

The outside basket steps used for transferring in and out of the basket will be at the same level as the basket floor and will be constructed of aluminum treadplate. The steps on the front and sides are approximately 8.00" deep. The front corners of the basket step will be mitered at 45 degrees to allow the basket to be maneuvered closer to buildings when approaching at an angle.

Four (4) stainless steel pompier belt safety loops will be attached to the inside of the basket. Two (2) lifting eyes will be provided on the bottom side of the basket support structure.

Four (4) rubber bumpers are provided on the bottom side of the basket structure for damage protection when setting it down on a surface.

The basket interior will be illuminated as required per the current edition of NFPA 1901. Electrical sub-components will be mounted under the basket in a enclosed area providing protection from heat exposure while allowing for easy servicing and maintaining an unobstructed basket interior.

BASKET SIDES

The sides of the basket will be of tubular steel construction and aluminum sheet skin, and along with the basket doors, will form a continuous 42.00" high wall around the basket.

PLATFORM ENTRANCES/EXITS

Two (2) swing-in, spring-loaded, self-closing doors will be of steel frame construction with an aluminum sheet skin and will be provided on the 45 degree angles at the front of the platform. A paddle style door latch will allow the basket doors to be opened from the outside by applying pressure to the paddle with the hand. The rear of the platform will be equipped with a vertical self-closing gate for transfer to and from the platform's ladder device.

ACCESSORY MOUNTING RECEPTACLES

Universal accessory mounting receptacles will be permanently affixed on the left side of the basket to receive options such as the rescue basket holders, rappelling arms, roof ladder brackets, winch, etc. Complete interchangeability will be required without modification to the basket.

HALLIGAN TOOL MOUNTING BRACKETS

Brackets will be provided inside the platform basket for mounting a “set of Irons” 32 inch Pro Bar and 8lb Flat head axe. A total of one (1) sets of brackets will be provided.

HOSE BOX AT PLATFORM

There will be one (1) hose storage box with a cover and rubber draw latch provided at the platform. A brushed stainless steel scuffplate will be provided under each latch. The box will be located at the right side of the basket when viewed from the turntable and will match the finish of the aerial device. The box will be sized to fit 100' of Key ECHO 10 1.75" diameter hose.

Drain holes will be provided in the bottom corners of each box and a louver will be provided on each side near the top of the box, below the latches.

AXE MOUNTING BRACKETS

Brackets will be provided in the aerial platform basket for mounting one (1) fire axe(s). The type of axe mounted here will be a pickhead axe. The mounting plates for this installation will be stainless steel.

LIGHTS FOR TURNTABLE WALKWAY

There will be On Scene Model 73006-WHW 6.00" long white LED lights and P25 white LED lights provided at the aerial turntable. The lights will be located to illuminate the entire walking surface of the turntable including the area around the turntable console. These lights will be activated by the aerial master switch.

TURNTABLE CONSOLE LIGHTING

There will be one (1), TecNiq Model E10, white LED light mounted in the turntable console cover to illuminate the controls located on both the upper and lower portion of the turntable control station. These lights will be activated by the aerial master switch.

BASKET HEAT SHIELDS

A heat reflective shield, constructed of 0.063 aluminum will be provided on the front, sides, bottom, and access doors of the basket.

These heat shields will be painted to match the aerial device.

The heat shields on the bottom of the basket will be easily removable for ease of servicing components located under the basket.

INFORMATION CENTER

There will be an information center provided. The information center will operate in temperatures from -40 to 185 degrees Fahrenheit. The information center will employ a Linux operating system and a 7.00" (diagonal measurement) LCD display. The LCD will have a 1000 nits rated color display. The LCD will be daylight visible. The LCD display will be encased in an ABS, grey plastic housing with a black decal. There will be five (5), weather-resistant user interface buttons provided. The LCD display can be changed to an optional single foreign language.

OPERATION

The information center will be designed for easy operation in everyday use. There will be a page button to cycle from one screen to the next screen in a rotating fashion. A video button will allow an NTSC camera signal into the information center to be displayed on the LCD. If any button is pressed while viewing a video feed, the information center will return to the vehicle information screens. There will be a menu button to provide access to maintenance, setup, and diagnostic screens. All other button labels will be specific to the information being viewed.

GENERAL SCREEN DESIGN

Where possible, background colors will be used to provide vehicle information *At A Glance*. If the information provided on a screen is within acceptable limits, a green background color will be used. If the information provided on a screen is not within acceptable limits, an amber background color will indicate a caution condition and a red background color will indicate a warning condition.

Every screen in the information center will include the aerial tip temperature, the time (12- or 24-hour mode) and a text Alert Center. The time will be synchronized between all Command Zone color displays located on the vehicle. The Alert Center will display text messages for audible alarms. The text messages will identify any items causing the audible alarm to sound. If more than one (1) audible alarm is activated, the text message for each alarm will cycle every second until the problems have been resolved. The background for the Alert Center will change to indicate the severity of the warning message. Amber will indicate a caution condition and red will indicate a warning condition. If a warning and a caution condition occur simultaneously, the red background color will be shown for all Alert Center messages.

A label will be provided for each button. The label will indicate the function for each active button for each screen. If the button is not utilized on specific screens, it will have a button label with no text.

Symbols will accurately depict the aerial device type the information pertains to such as rear mount ladder, rear mount platform, mid-mount ladder or mid-mount platform.

PAGE SCREENS

The Information center will include the following pages:

The Aerial Main and Load Chart page will indicate the following information:

- Rungs Aligned and Rungs Not Aligned will be indicated with text and respective green or red colored ladder symbols.
- Ladder Elevation will be indicated via a fire apparatus vehicle with ladder symbol with the degree of elevation indicated between the vehicle and ladder.
- Water Flow (if applicable) will be indicated via a water nozzle symbol and text indicating flow / time.
- Breathing Air Levels will be indicated via an air bottle symbol and text indicating the percent (%) of air remaining. A green bar graphs shown inside the bottle will indicate oxygen levels above 20%. A red bar graph will indicate oxygen levels at or below 20%. When oxygen levels are at or below 10% the red bar graph will flash.
- The Aerial Load Chart will indicate the load limit on each section of the ladder based on actual ladder position and water flow (if applicable).
- *At A Glance* color features will be utilized on this screen. Caution type conditions will be indicated via a yellow background. Warning type conditions will be indicated via a red background. Conditions operating within acceptable limits will be indicated via a green background.

The Aerial Reach and Hydraulic Systems page will indicate the following information:

- Aerial Hydraulic Oil Temperature will be indicated with symbol and text. At a glance features will be utilized.
- Aerial Hydraulic Oil Pressure will be indicated with a symbol and text. At a glance features will be utilized.
- The following calculations will be indicated on a representative vehicle symbol:
 - Aerial Device Extension length.
 - Aerial Device Height indicating the height of the aerial device tip from the ground.
 - Aerial Device Reach indicating the horizontal distance the aerial reaches from the turntable.
 - Aerial Device Angle indicating the angle from the vehicle which the device is at.
- *At A Glance* color features will be utilized on this screen. Caution type conditions will be indicated via a yellow background. Warning type conditions will be indicated via a red background. Conditions operating within acceptable limits will be indicated via a green background.

The Level Vehicle page will indicate the following information:

- The grade of the vehicle will be indicated via a fire apparatus vehicle symbol with the degree of grade shown in text format. The symbol will tilt dependent on the vehicle grade.
- The slope of the vehicle will be indicated via a fire apparatus vehicle symbol with the degree of slope shown in text format. The symbol will tilt dependent on the vehicle slope.
- Outriggers status will be indicated via a colored symbol for each outrigger present. Each outrigger status will be defined as one of the following:
 - Outrigger stowed indicated with a silver pan located close to the vehicle
 - Outrigger fully extended indicated with a fully deployed green outrigger
 - Outrigger short-jacked indicated by a yellow outrigger partially deployed
 - Outrigger not set indicated by a red outrigger that is not set on the ground
- A text box located on the vehicle symbol will be utilized to identify the overall status of the outrigger leveling system. The following status will be indicated in the text box:
 - Deployed status will indicate all outriggers are properly set on the ground at full extension
 - Short jacked status will indicate one or more outriggers are set on the ground but not fully extended.
 - Not Set status will indicate one or more outriggers is not properly set on the ground.
 - Stowed status will indicate all outriggers are stowed for vehicle travel.
- A bedding assist alert will indicate that the aerial device is being aligned by the Command Zone system as the operator lowers the aerial device into the cradle with the joystick.
- *At A Glance* color features will be utilized on this screen. Caution type conditions will be indicated via a yellow background. Warning type conditions will be indicated via a red background. Conditions operating within acceptable limits will be indicated via a green background.

MENU SCREENS

The following screens will be available through the Menu button:

The View System Information screen will display aerial device hours, aerial PTO hours, ladder aligned for stowing, aerial rotation angle, total water flow (if applicable), and aerial waterway valve status (if applicable).

The Set Display Brightness screen will allow brightness increase and decrease and include a default setting button.

The Configure Video Mode screen will allow setting of video contrast, video color and video tint.

The Set Startup screen allows setting of the screen that will be active at vehicle power-up.

The Set Date and Time screen has a 12- or 24-hour format, and allows setting of the time and date.

The View Active Alarms screen shows a list of all active alarms including the date and time of each alarm occurrence and shows all alarms that are silenced.

The System Diagnostics screen allows the user to view system status for each module and it's respective inputs and outputs. Viewable data will include the module type and ID number; the module version; and module diagnostics information including input or output number, the circuit number connected to that input or output, the circuit name (item connected to the circuit), status of the input or output, and other module diagnostic information.

Aerial calibrations screen indicates items that may be calibrated by the user and instructions to follow for proper calibration of the aerial device.

Button functions and button labels may change with each screen.

LOWER CONTROL STATION

A lower control station with pendant control will be located at the rear of the apparatus in an easily accessible area. The controls and indication labels will be illuminated for nighttime operation. The following items will be furnished at the lower control station and will be clearly identified and conveniently located for ease of operation and viewing:

- Level assist switch
- Override switch to override microprocessor
- Emergency power unit switch

AERIAL DEVICE CONTROL STATIONS

There will be two (2) aerial device control stations, one (1) will be referred to as the basket control station, and the other as the turntable control station. All elevation, extension, and rotation controls will operate from both of these locations. The controls will permit the operator to regulate the speed of the aerial functions, within the safe limits as determined by the manufacturer and NFPA standards. The controls will be clearly marked and illuminated for night time operation.

Each control will be equipped with an operator presence, preventing accidental activation.

TURNTABLE CONTROL STATION

The turntable control station will be located on the right side of the turntable so the operator may easily observe the basket while operating the controls. A console cover will be provided at the turntable control station. The controls will be so designed to allow the turntable control station to immediately override the basket controls even if the ladder is being operated by the basket controls.

The following items will also be provided at the turntable control station and be clearly identified and illuminated for nighttime operation and conveniently located for ease of operation and viewing:

- Three (3) separate controls for raise/lower, extend/retract, and left/right rotation
- Intercom controls
- Tip tracking light switch
- Emergency power unit switch
- Operator's load chart
- Two (2) position switch for selecting aerial operational speed
- Ladder illumination switch (if equipped)
- Aerial monitor switches

BASKET CONTROL STATION

The basket control station will be located at the front, center of the platform basket. The following items will also be provided at the basket control station and be clearly identified and illuminated for nighttime operation and conveniently located for ease of operation and viewing:

- Three (3) separate controls for raise/lower, extend/retract, and left/right rotation
- Intercom controls
- Tip tracking light switch
- Basket leveling switches
- Operator's load chart
- Aerial monitor switches

HIGH IDLE

The high idle will be controlled by the microprocessor. The microprocessor will automatically adjust the engine rpm, to compensate for the amount of load placed upon the system. The system will include a safety device that allows activation of the high idle, only when the parking brake is set and the transmission is placed in neutral.

INTERIOR BASKET ILLUMINATION

There will be three (3) 20.00" weather resistant strip lights with white LEDs and stainless steel shield provided to illuminate the interior of the aerial basket.

- One (1) light over the control console
- One (1) light on the left side rear of the basket
- One (1) light on the right side rear of the basket

The lights will be activated when the battery switch is on and the aerial master switch is on.

STABILIZERS

The vehicle will come equipped with a stabilization system consisting of six (6) hydraulically operated stabilizers. The middle two (2) will be out and down style, the front and rear two (2) will be down only. This system will meet or exceed all requirements of the NFPA specifications related to stabilization and setup on sloped surfaces.

The stabilizer/leveling jacks will have a maximum spread of 18' measured from the centerline of the jack footpads when the beams are fully extended. The beams will be 6.81" wide x 13.00" high with 1.00" thick top and bottom plates and 1/2" thick sides of 100,000-PSI minimum yield strength steel. The cylinders will have pilot-operated check valves with thermal relief designed to ensure that the beams will not drift out of the stowed position during travel. Wear pads will guide the stabilizers.

The horizontal extension cylinders will be totally enclosed within the beams and will incorporate telescoping hydraulic tubing to supply the jack cylinder hydraulic power. Stabilizer hydraulic hoses will remain stationary during operation of the stabilizers to prevent hose wear and potential failure. The cylinders will be equipped with decelerators to reduce the speed of extension and retraction when the beams are near the fully retracted and extended positions. The stabilizer extension hydraulic cylinders will have the following dimensions: 2.25" bore, 1.38" rod, and 62.25" stroke.

The front vertical jack cylinders will be capable of 15.00" ground penetration. The middle and rear vertical jack cylinders will be capable of 18.00" ground penetration. The cylinders will be supplied with pilot operated check valves on each jack cylinder to hold the cylinder in the stowed or working position, should a charged line be severed at any point in the hydraulic system. For safety, the integral holding valves will be located in the cylinder base, NOT in the transfer tube. Vertical jack cylinder rods will be fully enclosed by a telescoping inner box to protect the cylinder rods from damage. The stabilizer jack hydraulic cylinders will have the following dimensions: 4.25" bore, 3.00" rod, and 34.88" stroke.

The middle and rear stabilizer jack will have a polished stainless steel shield. The stainless steel shield will be a maximum of 14.00" wide so as to allow the extension of the stabilizer between parked cars or other obstacles. This plate will serve as a protective guard and a mounting surface for warning lights. The top, forward, and rear edges will be flanged back 90 degrees for added strength. The front stabilizers will be designed for easy cab tilt.

STABILIZER PADS

The stabilizer footpad will include an integrated stabilizer pad. The footpad will be attached to the jack cylinder rod by means of a machined ball at the end of the jack cylinder rod which mates to a socket machined into the footpad. The footpad will automatically position itself when being stowed so that no portion of the foot extends outside the body.

STABILIZER CONTROLS

A portable stabilizer control pendant will be provided. The control pendant will be weatherproof and oil resistant. Each function and indicator light will be labeled on a mylar lexan panel. The control pendant can be taken as far away as 15' from the vehicle with an attached coil cable.

The stabilizer control pendant will include the following:

- One (1) green power indicator light for stabilizer control that will be illuminated when the Stabilizer Power Enable switch has been activated. This will be interlocked such that the aerial master must be activated, the ladder is in the cradle, or the Global Override at the rear of the apparatus is activated.
- Two (2) electric toggle switches for stabilizers: each toggle switch will control the extend/retract (middle only) and raise/lower (front/middle/rear) of its respective stabilizer to allow vehicle set up in restricted areas and/or on uneven surfaces.
- Level assist switch: The stabilizer control system will incorporate a computerized leveling system to enhance the stabilizer set up. The computerized system will ensure full stabilizer extension, proper jack penetration, and will level the vehicle within eight tenths of a degree of level for safe operation of the aerial device.
- Stow assist switch: The stabilizer control system will incorporate a computerized system to move all six (6) stabilizer shoes to the full raised position while this switch is held.
- Tilt assist toggle switch: The stabilizer control system will incorporate a computerized system to tilt the chassis to five (5) degrees for enhanced side angle deployment of the aerial device.
- One (1) electric push button switch for the engaging the emergency power unit.
- One (1) red "stabilizer not stowed" indicator light: this light will illuminate when the stabilizers are not in the fully stowed position.
- Two (2) fully extended beams green indicator lights: these lights will be illuminated when each of the respective stabilizer beams are fully extended.
- Six (6) firm on ground green indicator lights: each light will be illuminated when its respective stabilizer shoe is in the load supporting condition.

Each toggle switch will activate the engine fast idle automatically.

Manual override will be supplied for each stabilizer control valve.

A "Stabilizers Not Stowed" indicator will be provided in the driver's compartment. It will illuminate automatically whenever the stabilizers are not fully stowed to prevent damage to the apparatus if moved. The stabilizer system will also be wired to the "Do Not Move Indicator Light", which will flash whenever the apparatus parking brake is not fully engaged and the stabilizers are not fully stowed.

CRADLE INTERLOCK SYSTEM

A cradle interlock system will be provided, to prevent the lifting of the aerial from the nested position, until the operator has positioned all the stabilizers in a load supporting configuration. A switch will be installed at the cradle, to prevent operation of the stabilizers once the aerial has been elevated from the nested position.

STABILIZER CONTROL BOX ALUMINUM DOOR

A vertically hinged smooth aluminum door will be provided over the stabilizer control box. The door will be hinged inboard.

HYDRAULIC CYLINDERS

All cylinders used on the aerial device will be produced by a manufacturer that specializes in the manufacture of hydraulic cylinders.

Each cylinder will include integral safety holding cartridges. No manifold or transfer tube mounted cartridge will be acceptable.

Each cylinder will be designed to a minimum safety factor of 4:1 to failure.

All safety holding cartridges will be installed at the cylinder manufacturer, in a controlled clean environment to avoid possible contamination and or failure.

POWER TAKEOFF/HYDRAULIC PUMP

The apparatus will be equipped with a power takeoff driven by the chassis transmission and actuated by an electric shift, located inside the cab. The power takeoff which drives the hydraulic pump will meet all the requirements for the aerial unit operations.

An amber indicator light will be installed on the cab instrument panel to notify the operator that the power takeoff is engaged.

An interlock will be provided that allows operation of the aerial power takeoff shift only after the chassis spring brake has been set and the chassis transmission has either been placed in the neutral position or drive position after the driveline has been disengaged from the rear axle.

The hydraulic system will be supplied by a variable displacement load and pressure compensating piston pump. The pump will meet the demands of all three simultaneous aerial functions. The pump will provide proper flow for single aerial function with the engine at idle speed. A switch will be provided on the control console to increase the engine speed for multiple function operation.

EMERGENCY PUMP

The hydraulic system will be designed with an auxiliary power unit meeting the guidelines of the current NFPA 1901 standard.

The aerial will be equipped with an emergency hydraulic pump, electrically driven from the truck batteries. The pump will be capable of running for 30 minutes for limited aerial functions to stow the unit in case of a main pump or truck system failure. A momentary switch will be located at the stabilizer and aerial control locations to activate the emergency pump.

AERIAL CONTROL VALVE

The aerial hydraulic control valve will be designed with special spool flows, limiting the oil flow for the designed function speed. The valve will be electrically controlled and be located below the swivel and integrated with the stabilizer control manifold. The handles will be oriented outward and will be spaced 1.80" apart. The valve spools will be designed to bleed off downstream pressure, in the neutral position and allow proper sealing of any cylinder holding cartridge.

OIL RESERVOIR

The oil reservoir will have a minimum capacity of 39 gallons. The oil fill location will be easily accessible and be labeled "Hydraulic Oil Only" and also indicate the grade of oil that is installed in the reservoir. A drain port will be provided.

Two suction ports will be provided, one for the main hydraulic pump and one for the emergency pump. The emergency suction port will be raised slightly off the bottom of the reservoir.

Magnetic filter will be installed in line with the return hose.

A float type sending unit in the reservoir will provide an indication of oil level on an electronic display. A temperature sending unit in the reservoir will provide indication of the oil temperature on an electronic display.

The hydraulic oil reservoir will be labeled per the current edition of NFPA 1901 standard.

RETURN FILTER

The low pressure oil return filter will be remote mounted in the return line and designed to prevent oil loss during filter change. A 50 psi bypass will be included to protect the element and hydraulic system during lower than normal operating temperatures. The system will incorporate the following filter to provide dependable service:

- return filter: beta 1000 at 6 micron

HYDRAULIC SWIVEL

The aerial ladder will be equipped with a three (3) port, high pressure hydraulic swivel which will connect the hydraulic lines from the hydraulic pump and reservoir through the rotation point to the aerial control bank. The hydraulic swivel will allow for 360 degree continuous rotation of the aerial.

ELECTRIC SWIVEL

The ladder will be equipped with an electric swivel to allow 360 degrees rotation of the aerial while connecting all electrical circuits through the rotation point. A minimum of 36 collector rings will be provided that are capable of supplying 20 amp continuous service. All collector rings will be enclosed and protected with desiccant plugs against condensation and corrosion. No oil or silicone will be used.

WATER SWIVEL

Water will be transferred to the aerial waterway by means of a 5.00" internal diameter waterway, through the swivel, permitting 360 degree continuous rotation.

13-BIT ABSOLUTE ENCODER

The aerial ladder will be equipped with a 13-Bit Absolute Encoder which provides 8192 counts per shaft turn for position and direction reference.

The 13-Bit Absolute Encoder will provide a unique binary word to reference each position and direction for all 360 degrees of rotation.

If the power is interrupted for any reason, the 13-Bit Absolute Encoder will allow power to be returned to the system without having to re-zero the settings.

The 13-Bit Absolute Encoder will be an integral part of a micro-processor based control system.

ELECTRICAL SYSTEM

The aerial device will utilize a microprocessor-based control system. The system will consist of the following components:

Control System Modules

Each of the control system modules will be configured as follows:

Sealed to a NEMA 4X rating

Operating range from -40 degrees F to 156 degrees F (-40 degrees C to 70 degrees C)

Communicate using J1939 data link

Two (2) diagnostic LED lights

One (1) green light that illuminates when module has power (B+) and ground

One (1) red light that flashes to indicate the module is capable of communicating via the data link

Up to 16 diagnostic LEDs on each module

Ground matrix identification system

The following control system modules will be used:

Control Module

Main controller for the system

USB connection allows for computer diagnostics

Power Module

Built-in fault sensing

Eight (8) digital outputs
Pulse width modulating (PWM) capable
10A continuous per output
Circuit protection based on actual current draw (not affected by heat)
Current Control Module
Built-in fault sensing
Three (3) analog inputs
Eight (8) digital outputs
Pulse width modulating (PWM) capable
3A continuous per output
Closed Loop System
Circuit protection based on actual current draw (not affected by heat)
Input Module
16 software selectable (digital or analog) inputs
Output Module
16 digital outputs
Input/Output Module
Eight (8) software selectable (digital or analog) inputs
Eight (8) digital outputs
Valve Module
36 digital inputs
36 digital outputs
TIP LIGHT

There will be two (2) Whelen® Model MPB*, 4,100 lumens 12 volt DC LED lights with adjustable mounts installed on the front of the basket. The painted parts of this light assembly to be ~~white~~ Black. The lights will be controlled with the tracking lights.

TRACKING LIGHTS

There will be two (2) Whelen® MPP*, 5,090 lumens 12 volt DC LED lights with low profile pedestal mounts installed near the tip of the base section of the aerial device. The lights are installed at the tip so the overall width of the apparatus is not affected. The lights will be mounted below the top edge of the aerial device so the overall height of the apparatus is not affected.

- One (1) located on the left side with flood optics
- One (1) located on the right side with flood optics
- The painted parts of this light assembly to be white.

Power to the lights will be controlled by a master on/off switch at the turntable control operator's position.

BASKET ACCESS LADDER

Access to the basket will be provided by a pull-out, swing-down, heavy duty, tubular constructed climbing ladder attached to the rear panel. The access ladder will be recessed into the angled corners of the rear body.

All steps will have a height not greater than 14.00" from top surface to top surface.

The "pool" style ladder will have knurled aluminum rungs and non-knurled aluminum stiles.

The bottom step height will not exceed 24.00" from the ground to the top surface of the step at any time.

STEP LIGHTS

THERE WILL BE TWO (2) WHITE LED STEP LIGHTS PROVIDED FOR EACH SET OF AERIAL BASKET ACCESS STEPS.

In order to ensure exceptional illumination, each light will provide a minimum of 25 foot-candles (fc) covering an entire 15" x 15" square placed ten (10) inches below the light and a minimum of 1.5 fc covering an entire 30" x 30" square at the same ten (10) inch distance below the light.

The step lights will be actuated by the aerial master switch in the cab.

These lights will meet NFPA requirements for step lighting.

LIGHTING ON AERIAL DEVICE

There will be TecNiq, Model D02, LED rung lighting provided on both sides of the aerial ladder base, lower mid, upper mid and fly sections. The lighting will be located adjacent to the ladder rungs along the lower rail of the ladder sections and will run the length of the ladder section.

The color of the sections will be per the following:

- The base section of the ladder to be red.
- The lower mid-section of the ladder to be red.
- The mid-section of the ladder to be red.
- The upper mid-section of the ladder to be red.
- The fly section of the ladder to be red.

The LED rung lighting will be activated when the aerial master switch is activated.

The lights may be load managed when the parking brake is applied.

STABILIZER WARNING LIGHTS

There will be our (4) Whelen®, Model M6*C, LED flashing warning lights with Whelen, Model M6FC, chrome flanges installed, one (1) on each stabilizer cover panel.

- The front stabilizer pan lights will be red LED with a clear lens
- The rear stabilizer pan lights will be red LED with a clear lens

These warning lights will be activated by the same switch as the side warning lights.

STABILIZER BEAM WARNING LIGHTS

Two (2) 4.00" diameter red LED flashing lights will be mounted on each stabilizer, one (1) facing forward and one (1) facing rearward. The lights will be Grote Supernova 40 series LED lights. The lights will be recessed in the horizontal beam of the stabilizer. These warning lights will be activated with the aerial master switch.

STABILIZER SCENE LIGHTS

There will be one (1) Amdor®, Model AY-LB-12HW012, 190 lumen, 12" long, white LED strip light installed under each stabilizer beam to illuminate the surrounding area. A total of six (6) lights will be installed. The lights will be activated by the aerial master switch.

PLATFORM 120-VOLT ELECTRIC SYSTEM

Two (2), 20 amp, NEMA L5-20, 120-volt, three (3)-prong twist lock receptacles with weatherproof covers will be provided in the aerial platform. Both receptacles will be located on the left side rear of the basket. Each receptacle will be supplied from individual branch circuits protected by dedicated 20 amp/120-volt circuit breakers. All wiring will be sized to and conform to the latest edition of NEC standards.

120 VOLT PCP2AP BASKET LIGHTING

There will be three (3) Whelen, Model PCP2AP white 120 volt AC LED combination spot and floodlight(s) provided and mounted (1) on the front of the aerial basket located in the front center of platform, (1) Light on the left side (1) light on the right side of the basket. Light(s) will be switched at the platform/tip and turntable.

2-WAY AERIAL COMMUNICATION SYSTEM

There will be a Fire Research model ICA900-112 two-way intercom system provided. The control module will be located on the turntable operator console, provided there is room, and have an LED volume display and push-button volume control.

A hands free module will be located at the aerial tip or platform and constantly transmit to the other module unless the control module push-to-talk button is pressed.

Each intercom unit will be weatherproof.

AERIAL PEDESTAL GENERATOR

The aerial pedestal will accommodate the height of the cab.

LYFECOMBO™ BRACKETS

Brackets will be provided to increase the safety of firefighters during fire ground and rescue operations. The removable brackets will have the following three (3) functions: securing a roof ladder to the basket, two (2) rappelling anchor points, and mounting bars to allow the secure mounting of a rescue basket stretcher.

LyfeLadder™ brackets will be designed to allow firefighter access below the basket using up to a 20' roof ladder. The ladder will be secured through its beams and one (1) rung, by a 1.00" diameter aluminum rod capable of being positively latched in place and able to withstand a minimum of a 500lb load. There will be a latch to keep the ladder in a vertical position at all times. A set of nylon guides will be provided to aid in positioning the roof ladder on the mounting brackets.

Two (2) **LyfeEye™** rappelling arms will be provided. Forged stainless steel eyebolts with a 1.38" inside diameter will be incorporated into the design of the brackets for use as a rappel line anchor. Each anchor point will have a capacity of 300lb.

LyfeSupport™ rescue basket support brackets will be provided to allow patient transport using the aerial. Two (2) quick clip basket straps will be used to secure the basket to the brackets.

Strain gauging and testing will have been completed on the system (ladder and complete holding device) to ensure structural integrity of all components and maintain a minimum of two to one (2:1) safety factor.

AIR HORN CONTROL AT AERIAL TURNTABLE

An air horn control button will be provided at the aerial turntable. This button will be red in color and properly labeled. Collector ring space must be available for this option to be utilized.

AERIAL TURNTABLE MANSAVER™ BAR

A ManSaver™ bar will be installed at the aerial turntable.

AERIAL WATERWAY

The aerial waterway will be capable of being supplied by either a mid-ship mounted pump or an external water source through a 5.00" intake at the side of the apparatus.

A 5.00" water swivel will be installed below the aerial turntable permitting the ladder to rotate 360 degrees continuously.

A 5.00" water swivel will be installed at the aerial heel pivot pin that will permit water tower operations of -15 degrees to 77 degrees. The heel pivot pin will not be integral with the waterway swivel at any point. The waterway design will allow complete servicing of the waterway swivel without disturbing the heel pivot pin.

A telescoping aluminum waterway will be installed on the side of the aerial ladder sections. The waterway will consist of a 5.50" diameter tube for the base section, 5.00" diameter tube for the lower mid-section, 4.50" diameter tube for the center mid-section, 4.00" diameter tube for the upper mid-section, and 3.50" diameter tube for the fly section.

A 1.50" drain will be provided for the waterway.

WATERWAY SEALS

The waterway seals will be of type-B PolyPak design, composed of nitroxile seal and a nitrile wiper, which together offer maximum stability and extrusion resistance on the waterway. The seal will be capable of withstanding pressures up to 2000 psi, temperatures in excess of 250 degrees Fahrenheit and have resistance to all foam generating solutions. The seals will be internally lubricated.

The waterway seals will have automatic centering guides constructed of synthetic thermalpolymer. The guides will provide positive centering of the extendible sections within each other and the base section to insure longer service life and smoother operation.

PLATFORM WATER SYSTEM

A 4.00" (internal diameter) water swivel will connect the fly section waterway to the platform waterway. The water swivel will permit water tower operations from -15 degrees to 77 degrees. The water will be routed from the swivel to a 4.00" gear operated valve(s) on the front of the platform using a combination of 4.00" tubes and piping. The monitor(s) will be bolted onto the valve(s).

A 2.50" preset pressure relief valve will be provided in the waterway system. It will be designed to protect the aerial waterway from excess pressure. It will dump water to the ground when operating.

A shower nozzle rated at 75 will be provided beneath the platform for heat protection for the platform personnel. A direct linkage control for the shower nozzle will be provided.

AERIAL MONITOR(S)

There will be two (2) Elkhart Brass 1,250 GPM monitors provided at the platform.

One (1) will be a Elkhart Brass Vulcan 8500-1 dual hand wheel controlled monitor with rotating base with an Elkhart Brass 282A stream shaper and Elkhart ST 194 quad stacked tips. 1-3/8", 1.50", 1.75" and 2.0". The other will be an Elkhart Brass Vulcan 8500-2 tiller monitor with an Elkhart Brass SM-1250 2.5" FNH Elkhart Brass 282A stream shaper with a Select-O-Matic Master Stream Low Pressure X-Stream Nozzle, manual type, 300-1250 gpm. Both shall independent and be manually controlled at the basket with a handwheel controlled butterfly valve.

WATERWAY FLOWMETER

Waterway flow, including total water flowed, will be monitored by the microprocessor. An LCD display will be located at the upper and lower control stations.

WATERWAY INLET

There will be a 5.00" schedule 10 stainless steel inlet pipe on the right side of the apparatus. The inlet will be connected to the base of the ladder, through the turntable swivel, to assure continuous rotation. The inlet will terminate with a 5.00" NST chrome adapter and a long handled chrome cap.

TOOLS

The following tools will be provided for re-torquing of all specified bolts as recommended by the manufacturer:

Torque Wrench

All Required Extensions, Sockets and Adapters

4-to-1 Multiplier

MANUALS

The aerial manufacturer will provide two (2) operator maintenance manuals and two (2) wiring diagrams pertaining to the aerial device.

INITIAL INSTRUCTION

On initial delivery of the fire apparatus, the contractor will supply a qualified representative to demonstrate the apparatus and provide initial instruction to the fire department regarding the operation, care, and maintenance of the apparatus for a period of three (3) consecutive days.

LOOSE EQUIPMENT

The following equipment will be furnished with the completed unit:

- One (1) bag of chrome, stainless steel, or cadmium plated screws, nuts, bolts and washers, as used in the construction of the unit.

NFPA REQUIRED LOOSE EQUIPMENT PROVIDED BY FIRE DEPARTMENT

The following loose equipment as outlined in NFPA 1901, 2016 edition, section 9.9.3 and 9.9.4 will be provided by the fire department.

- 800 ft (240 m) of 2.50" (65 mm) or larger fire hose, in any combination.
- 400 ft (120 m) of 1.50" (38 mm), 1.75" (45 mm), or 2.00" (52 mm) fire hose, in any combination.
- One (1) handline nozzle, 200 gpm (750 L/min) minimum.
- Two (2) handline nozzles, 95 gpm (360 L/min) minimum.
- One (1) playpipe with shutoff and 1.00" (25 mm), 1.125" (29 mm), and 1.25" (32 mm) tips.
- One (1) SCBA complying with NFPA 1981 for each assigned seating position, but not fewer than four (4), mounted in brackets fastened to the apparatus or stored in containers supplied by the SCBA manufacturer.
- One (1) spare SCBA cylinder for each SCBA carried, each mounted in a bracket fastened to the apparatus or stored in a specially designed storage space(s).
- One (1) first aid kit.
- Four (4) salvage covers, each a minimum size of 12 ft × 14 ft (3.6 m × 5.5 m).
- Four (4) combination spanner wrenches.
- Two (2) hydrant wrenches.
- One (1) double female 2.50" (65 mm) adapter with National Hose threads.
- One (1) double male 2.50" (65 mm) adapter with National Hose threads.
- One (1) rubber mallet, for use on suction hose connections.
- One (1) 150 ft (45 m) light-use life safety rope meeting the requirements of NFPA 1983.
- One (1) 150 ft (45 m) general-use life safety rope meeting the requirements of NFPA 1983.

- One (1) traffic vest for each seating position, each vest to comply with ANSI/ISEA 207, Standard for High Visibility Public Safety Vests, and have a five-point breakaway feature that includes two (2) at the shoulders, two (2) at the sides, and one (1) at the front.
- Five (5) fluorescent orange traffic cones not less than 28.00" (711 mm) in height, each equipped with a 6.00" (152 mm) retro-reflective white band no more than 4.00" (152 mm) from the top of the cone, and an additional 4.00" (102 mm) retro-reflective white band 2.00" (51 mm) below the 6.00" (152 mm) band.
- Five (5) illuminated warning devices such as highway flares, unless the five (5) fluorescent orange traffic cones have illuminating capabilities.
- One (1) automatic external defibrillator (AED).
- If the supply hose carried does not use sexless couplings, an additional double female adapter and double male adapter, sized to fit the supply hose carried, will be carried mounted in brackets fastened to the apparatus.
- If none of the pump intakes are valved, a hose appliance that is equipped with one or more gated intakes with female swivel connection(s) compatible with the supply hose used on one side and a swivel connection with pump intake threads on the other side will be carried. Any intake connection larger than 3.00" (75 mm) will include a pressure relief device that meets the requirements of 16.6.6.
- If the apparatus does not have a 2.50" National Hose (NH) intake, an adapter from 2.50" NH female to a pump intake will be carried, mounted in a bracket fastened to the apparatus if not already mounted directly to the intake.
- If the supply hose carried has other than 2.50" National Hose (NH) threads, adapters will be carried to allow feeding the supply hose from a 2.50" NH thread male discharge and to allow the hose to connect to a 2.50" NH female intake, mounted in brackets fastened to the apparatus if not already mounted directly to the discharge or intake.

DRY CHEMICAL EXTINGUISHER PROVIDED BY FIRE DEPARTMENT

NFPA 1901, 2016 edition, section 9.9.4 requires one (1) approved dry chemical portable fire extinguisher with a minimum 80-B:C rating mounted in a bracket fastened to the apparatus.

The extinguisher is not on the apparatus as manufactured. The fire department will provide and mount the extinguisher.

WATER EXTINGUISHER PROVIDED BY FIRE DEPARTMENT

NFPA 1901, 2016 edition, section 9.9.4 requires one (1) 2.5 gallon or larger water extinguisher mounted in a bracket fastened to the apparatus.

The extinguisher is not on the apparatus as manufactured. The fire department will provide and mount the extinguisher.

AERIAL LADDER BELTS

The following ladder belts will be provided:

- two (2) large/extra-large belts for 34"-42" waist
- one (1) XXL belt for 42"-50" waist

FLATHEAD AXE PROVIDED BY FIRE DEPARTMENT

NFPA 1901, 2016 edition, Section 9.9.4 requires one (1) flathead axe mounted in a bracket fastened to the apparatus.

The axe is not on the apparatus as manufactured. The fire department will provide and mount the axe.

PICKHEAD AXE PROVIDED BY FIRE DEPARTMENT

NFPA 1901, 2016 edition, Section 9.9.4 requires one (1) pick head axe mounted in a bracket fastened to the apparatus.

The axe is not on the apparatus as manufactured. The fire department will provide and mount the axe.

PAINT

The exterior custom cab and body painting procedure will consist of a seven (7) step finishing process.

1. Manual Surface Preparation - All exposed metal surfaces on the custom cab and body will be thoroughly cleaned and prepared for painting. Imperfections on the exterior surfaces will be removed and sanded to a smooth finish. Exterior seams will be sealed before painting. Exterior surfaces that will not be painted include; chrome plating, polished stainless steel, anodized aluminum and bright aluminum treadplate.
2. Chemical Cleaning and Pretreatment - All surfaces will be chemically cleaned to remove dirt, oil, grease, and metal oxides to ensure the subsequent coatings bond well. The aluminum surfaces will be properly cleaned and treated using a high pressure, high temperature 4 step Acid Etch process. The steel and stainless surfaces will be properly cleaned and treated using a high temperature 3 step process specifically designed for steel or stainless. The chemical treatment converts the metal surface to a passive condition to help prevent corrosion. A final pure water rinse will be applied to all metal surfaces.
3. Surfacer Primer - The Surfacer Primer will be applied to a chemically treated metal surface to provide a strong corrosion protective basecoat. A minimum thickness of 2 mils of Surfacer Primer is applied to surfaces that require a Critical aesthetic finish. The Surfacer Primer is a two-component high solids urethane that has excellent sanding properties and an extra smooth finish when sanded.
4. Finish Sanding - The Surfacer Primer will be sanded with a fine grit abrasive to achieve an ultra-smooth finish. This sanding process is critical to produce the smooth mirror like finish in the topcoat.
5. Sealer Primer - The Sealer Primer is applied prior to the Basecoat in all areas that have not been previously primed with the Surfacer Primer. The Sealer Primer is a two-component high solids urethane that goes on smooth and provides excellent gloss hold out when topcoated.
6. Basecoat Paint - Two coats of a high performance, two component high solids polyurethane basecoat will be applied. The Basecoat will be applied to a thickness that will achieve the proper color match. The Basecoat will be used in conjunction with a urethane clear coat to provide protection from the environment.
7. Clear Coat - Two (2) coats of Clear Coat will be applied over the Basecoat color. The Clear Coat is a two-component high solids urethane that provides superior gloss and durability to the exterior surfaces. Lap style and roll-up doors will be Clear Coated to match the body. Paint warranty for the roll-up doors will be provided by the roll-up door manufacture.

Each batch of basecoat color is checked for a proper match before painting of the cab and the body. After the cab and body are painted, the color is verified again to make sure that it matches the color standard. Electronic color measuring equipment is used to compare the color sample to the color standard entered into the computer. Color specifications are used to determine the color match. A Delta E reading is used to determine a good color match within each family color.

All removable items such as brackets, compartment doors, door hinges, and trim will be removed and separately if required, to ensure paint behind all mounted items. Body assemblies that cannot be finish painted after assembly will be finish painted before assembly.

TWO-TONE PAINT

The cab will be a two-tone, with the upper section painted “White” along with a shield design on the cab face and lower section of the cab and body painted CHFD Yellow. PPG Pierce yellow #30. Color panel to be provided for approval.

PAINT CHASSIS FRAME ASSEMBLY

The chassis frame assembly will be finished with a single system black (Is body color an option? If so make it yellow) top coat before the installation of the cab and body, and before installation of the engine and transmission assembly, air brake lines, electrical wire harnesses, etc.

Components that are included with the chassis frame assembly that will be painted are:

- Frame rails
- Frame liners
- Cross members
- Axles
- Suspensions
- Steering gear
- Battery boxes
- Bumper extension weldment
- Frame extensions
- Body mounting angles
- Rear Body support substructure (front and rear)
- Pump house substructure
- Air tanks
- Steel fuel tank
- Castings
- Individual piece parts used in chassis and body assembly

Components treated with epoxy E-coat protection prior to paint:

- Two (2) C-channel frame rails
- Two (2) frame liners

The E-coat process will meet the technical properties shown.

COMPARTMENT INTERIOR PAINT

The interior of all compartments will be painted with a gray spatter finish for ease of cleaning and to make it easier to touch up scratches and nicks.

SEATING POSITION LABELS

Provide Ten (10) permanent 3” X 5” engraved seating position labels Five (5) red and Five (5) blue.

Verbiage for each label will be provided during the preconstruction conference. Labels to be mounted at the factory as directed. RED for FIRE and BLUE for RIT

Example of Seat Position 3” X 5” tags

ENTRY PERSON	
EQUIPMENT	RESPONSIBILITIES
Portable Radio	Force entry
Set of Irons	Primary Search
Box Light	

FILM TECHNICAL PROPERTIES		
PROPERTY	TEST METHOD	PERFORMANCE
Color	—	Black
Film Thickness	—	0.5 - 1.5 Mils
Gloss - 60 Degree	ASTM D523	65 - 85
Pencil Hardness	ASTM D3363	2H Minimum
Direct Impact	ASTM D2794	100 in. - lbs. Minimum
Reverse Impact	ASTM D2794	60 in. - lbs. Minimum
Crosshatch Adhesion	ASTM D3359	4B - 5B
Humidity	ASTM D1735	1000 Hours Minimum
Water Immersion	ASTM D870	250 Hours Minimum
Gravelometer	GM9508P	6 Minimum
Throwpower	GM9535P	12 - 15 in.
Cold rolled steel lab panels, Zinc Phosphate pretreatment, 0.6 mils average film thickness, cured 20 minutes @ 350°F.		
PROPERTY	SUBSTRATE PRETREATMENT	SALT SPRAY* 1000 HOURS
Corrosion Resistance	CRS / Zinc Phos / Non-Chrome	1 - 2 mm
*Salt Spray - ASTM B117, cold rolled steel lab panels cured 20 minutes @ 350°F. [Average Total Scribe Creep]		

AERIAL DEVICE PAINT COLOR

The aerial device paint procedure will consist of a seven (7) step finishing process as follows:

1. Manual Surface Preparation - All exposed metal surfaces on the aerial device structural components above the rotation point will be thoroughly cleaned and mechanically shot-blasted to remove metal impurities and prepare the aerial for painting.
 2. Zinc Rich Primer - Zinc rich primer will be applied to the torque box and stabilizers.
 3. Primer/Surfacer Coats - A two (2) component epoxy primer/surfacer will be applied to the mechanically shot-blasted metal surfaces to provide a strong corrosion protective base coat and to smooth out the surface. All seams will be caulked with a two (2) component epoxy caulk before painting.
 4. Hand Sanding - The primer/surfacer coat of the outer surfaces of the hand rails and base rails will be lightly sanded to a smooth finish.
 5. Primer Coat - A two (2) component epoxy primer coat will be applied over the sanded primer.
 6. Topcoat Paint - Urethane base coat will be applied to opacity for correct color matching.
 7. Clear Coat - Two (2) coats of an automotive grade two (2) component urethane will be applied.
- Surfaces that will not be painted include all chrome plated, polished stainless steel, anodized aluminum and bright aluminum treadplate.

All buy out components, such as monitor, nozzle, gauges, etc. will be supplied as received from the vendor. Removable items such as brackets will be removed and painted separately to ensure paint coverage behind all mounted items.

The aerial device components will be painted as follows using the aforementioned seven (7) step finishing process:

- Aerial basket and basket leveling cylinders at tip: White
- Aerial device ladder sections and extension cylinders: White
- Aerial turntable and leveling cylinders at turntable: White
- Aerial control console: Yellow
- Aerial lift cylinders: Yellow
- Aerial rotation motor (if applicable): White
- Aerial torque box, support structure and components below the rotation point: gloss black primer
- Aerial stabilizers: Black 101
- Aerial boom support: gloss black primer

REFLECTIVE STRIPES 3M™ SCOTCHLITE 680 STRIPE (WHITE.)

Three (3) reflective stripes will be provided across the front of the vehicle and along the sides of the body. The reflective band will consist of a 1.00" gold stripe at the top with a 1.00" gap then an 8.00" white stripe with a 1.00" gap and a 1.00" gold stripe on the bottom.

The reflective band provided on the cab face will be at the headlight level.

REAR CHEVRON STRIPING 3M™ SCOTCHLITE

There will be alternating chevron striping located on the rear-facing vertical surface of the apparatus. 3M-Colors shall be 3983 Yellow 3892 Red Covered surfaces will include the rear wall, aluminum doors, and rear bumper. Rear compartment doors and stainless steel access doors will not be covered.

The colors will be red and fluorescent yellow green diamond grade.

Each stripe will be 6.00" in width.

This will meet the requirements of the current edition of NFPA 1901, which states that 50% of the rear surface will be covered with chevron striping.

REFLECTIVE STRIPE ON STABILIZERS 3M™ SCOTCHLITE

There will be a 4.00" wide fluorescent yellow green diamond grade reflective stripe provided on the forward and rear facing side of all aerial stabilizers.

INVERTED "V" CHEVRON STRIPING ON CAB AND CREW CAB DOORS

There will be alternating 3M™ Scotchlite chevron striping located on the inside of each cab and crew door. The striping will consist of the following colors:
Color shall be 3983 Yellow 3892 Red
The size of the striping will be 6.00".



LETTERING

The lettering will be totally encapsulated between two (2) layers of clear vinyl.

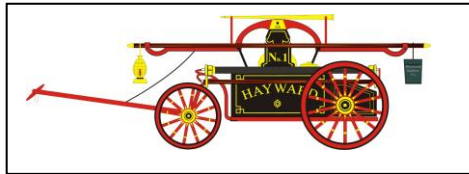
Forty-one (41) to sixty (60) genuine gold leaf lettering, 3.00" high, with outline and shade will be provided.

Provide 16" reflective Yellow letters on the roof "Tower 1-28 for aerial identification. (Pre-construction final)

BUCKET LETTERING

Located on the bucket doors in gold reflective with a drop shadow, vertically positioned on one door shall be **TOWER** and the other **1-28**.

On each side of the bucket shall be the departments hand pumper logo on the apparatus yellow color background.

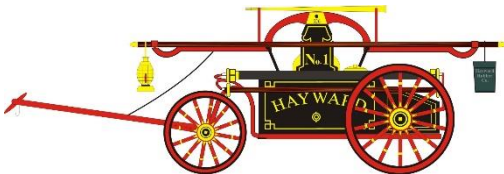


LADDER SIGN

The ladder signs located on each side of the apparatus shall be white with gold REFLECTIVE lettering and a black drop shadow. Final design and layout to be determined during pre-construction. TBD at pre-const.

COLCHESTER HAYWARD
28
FIRE DEPARTMENT

DEPARTMENT GRAPICS (FRONT DOORS)



The department's graphics (hand Pumper) and department name department name shall be provided on the 2 cab doors. The final image is subject to approval. Installed one (1) each side crew entry doors. Detail graphics to be provided, (Pre-construction meeting)

CREW COMPARTMENT REAR ENTRY DOORS

Provide (2) 18" department's Life Safety graphics as shown. Reflective color lettering and graphics. The final image is subject to approval. Installed one (1) each side crew entry doors.



REAR LADDER STORAGE DOOR LETTERING / GRAPHICS

Gold lettering with a black drop shadow

**TOWER
28**

FIRE APPARATUS PARTS MANUAL

There will be one (1) custom parts manual(s) in USB flash drive format for the complete fire apparatus provided.

The manual(s) will contain the following:

- Job number
- Part numbers with full descriptions
- Table of contents
- Parts section sorted in functional groups reflecting a major system, component, or assembly
- Parts section sorted in alphabetical order
- Instructions on how to locate parts

Each manual will be specifically written for the chassis and body model being purchased. It will not be a generic manual for a multitude of different chassis and bodies.

CHASSIS SERVICE MANUALS

There will be one (1) chassis service manuals on USB flash drives containing parts and service information on major components provided with the completed unit.

The manual will contain the following sections:

- Job number
- Table of contents
- Troubleshooting
- Front Axle/Suspension
- Brakes
- Engine
- Tires
- Wheels
- Cab
- Electrical, DC
- Air Systems
- Plumbing

- Appendix

The manual will be specifically written for the chassis model being purchased. It will not be a generic manual for a multitude of different chassis and bodies.

CHASSIS OPERATION MANUAL

The chassis operation manual will be provided on one (1) USB flash drive.

WARRANTY(S)

ENGINE WARRANTY

A Detroit Diesel **five (5) year** limited engine warranty shall be provided. A limited warranty certificate, shall be provided.

STEERING GEAR WARRANTY

A Sheppard **three (3) year** limited steering gear warranty shall be provided. A copy of the warranty certificate shall be provided.

REAR AXLE TWO (2) YEAR MATERIAL AND WORKMANSHIP WARRANTY

A Meritor axle limited warranty certificate, shall be provided.

ABS BRAKE SYSTEM THREE (3) YEAR MATERIAL AND WORKMANSHIP WARRANTY

A Meritor Wabco™ABS brake system limited warranty certificate shall be provided.

TRANSMISSION WARRANTY

The transmission will have a **five (5) year/unlimited mileage** warranty covering 100 percent parts and labor. The warranty shall be provided by Allison Transmission.

Note: The transmission cooler is not covered under any extended warranty you may be getting on your Allison Transmission. Please review your Allison Transmission warranty for coverage limitations.

TRANSMISSION COOLER WARRANTY

The transmission cooler will carry a five (5) year parts and labor warranty (exclusive to the transmission cooler). In addition, a collateral damage warranty will also be in effect for the first three (3) years of the warranty coverage and will not exceed \$10,000 per occurrence.

WATER TANK WARRANTY

A UPF poly water tank limited warranty certificate, shall be provided.

ROLL UP DOOR MATERIAL AND WORKMANSHIP WARRANTY

The roll-up doors shall have a limited warranty. The mechanical components of the roll-up door will be warranted against defects in material and workmanship for the lifetime of the vehicle. A minimum of a five (5) year limited warranty will be provided on painted and satin roll up doors.

PUMP WARRANTY

A Waterous pump limited warranty certificate, shall be provided.

MINIMUM OF A TEN (5) YEAR PUMP PLUMBING WARRANTY

The plumbing shall have a limited warranty of at least five years.

MINIMUM OF A TWENTY (20) YEAR AERIAL DEVICE STRUCTURAL INTEGRITY WARRANTY

The aerial device shall have a (20) twenty year structural warranty.

HYDRAULIC SYSTEM COMPONENTS WARRANTY

Aerial hydraulic system components will be provided with a five (5) year material and workmanship limited warranty.

HYDRAULIC SEAL WARRANTY

Aerial hydraulic seals will be provided with a three (3) year material and workmanship limited warranty.

AERIAL WATERWAY WARRANTY

A ten (10) year limited waterway warranty shall be provided.

FOUR (4) YEAR PRO-RATED PAINT AND CORROSION

A limited pro-rated paint warranty certificate, shall be provided

FIVE (5) YEAR MATERIAL AND WORKMANSHIP

A (5) year warranty shall be provided.

SIX (6) YEAR GENERATOR MATERIAL AND WORKMANSHIP WARRANTY

A Harrison Hydra-Gen limited warranty certificate, shall be provided.

TEN (10) YEAR PRO-RATED PAINT AND CORROSION

A (10) year warranty shall be provided.

CERTIFICATION(S)

VEHICLE STABILITY CERTIFICATION

The fire apparatus manufacturer will provide a certification stating the apparatus complies with NFPA 1901, current edition, section 4.13, Vehicle Stability. The certification will be provided at the time of bid.

ENGINE INSTALLATION CERTIFICATION

The fire apparatus manufacturer will provide a certification, along with a letter from the engine manufacturer stating they approve of the engine installation in the bidder's chassis. The certification will be provided at the time of bid.

POWER STEERING CERTIFICATION

The fire apparatus manufacturer will provide a certification stating the power steering system as installed meets the requirements of the component supplier. The certification will be provided at the time of bid.

CAB INTEGRITY CERTIFICATION

Provide a cab crash test certification with this proposal. The certification shall state that the cab meets or exceed the requirements below:

- European Occupant Protection Standard ECE Regulation No.29
- SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading Heavy Trucks
- SAE J2420 COE Frontal Strength Evaluation - Dynamic Loading Heavy Trucks
- **Roof Crush**

The cab will be subjected to a roof crush force of 100,000 lb. This value will be 450 percent of the ECE 29 criteria, which must be equivalent to the front axle rating up to a maximum of ten (10) metric tons.

- Side Impact

The cab will be subjected to dynamic preload with a 13,275-lb moving barrier is slammed into the side of the cab at 5.50 mph, striking with an impact of 13,000 ft-lb of energy. This test will closely represent the forces a cab will see in a rollover incident.

Frontal Impact

The cab will withstand a frontal force produced from 65,200 ft-lb of energy using a swing-bob type platen. The same cab will withstand all tests without any measurable intrusion into the survival space of the occupant area.

CAB DOOR DURABILITY CERTIFICATION

Robust cab doors help protect occupants. Cab doors will survive a 200,000 cycle door slam test where the slamming force exceeds 20 G's of deceleration. The bidder will certify that the sample doors similar to those provided on the apparatus have been tested and have met these criteria without structural damage, latch malfunction, or significant component wear.

WINDSHIELD WIPER DURABILITY CERTIFICATION

Visibility during inclement weather is essential to safe apparatus performance. Windshield wipers will survive a 3 million cycle durability test in accordance with section 6.2 of SAE J198 *Windshield Wiper Systems - Trucks, Buses and Multipurpose Vehicles*. The bidder will certify that the wiper system design has been tested and that the wiper system has met these criteria.

SEAT BELT ANCHOR STRENGTH

Seat belt attachment strength is regulated by Federal Motor Vehicle Safety Standards and should be validated through testing. Each seat belt anchor design will withstand 3000 lb. of pull on both the lap and shoulder belt in accordance with FMVSS 571.210 Seat Belt Assembly Anchorages. The bidder will certify that each anchor design was pull tested to the required force and met the appropriate criteria.

SEAT MOUNTING STRENGTH

Seat attachment strength is regulated by Federal Motor Vehicle Safety Standards and should be validated through testing. Each seat mounting design will be tested to withstand 20 G's of force in accordance with FMVSS 571.207 Seating Systems. The bidder will certify that each seat mount and cab structure design was pull tested to the required force and met the appropriate criteria.

CAB DEFROSTER CERTIFICATION

Visibility during inclement weather is essential to safe apparatus performance. The defroster system will clear the required windshield zones in accordance with SAE J381 Windshield Defrosting Systems Test Procedure and Performance Requirements - Trucks, Buses, and Multipurpose Vehicles. The bidder will certify that the defrost system design has been tested in a cold chamber and passes the SAE J381 criteria.

CAB HEATER CERTIFICATION

Good cab heat performance and regulation provides a more effective working environment for personnel, whether in-transit, or at a scene. The cab heaters will warm the cab 77 degrees Fahrenheit from a cold-soak, within 30 minutes when tested using the coolant supply methods found in SAE J381. The bidder will certify that a substantially similar cab has been tested and has met these criteria.

CAB AIR CONDITIONING PERFORMANCE CERTIFICATION

Good cab air conditioning temperature and air flow performance keeps occupants comfortable, reduces humidity, and provides a climate for recuperation while at the scene. The cab air conditioning system will cool the cab from a heat-soaked condition at 100 degrees Fahrenheit to an average of 72 degrees Fahrenheit in 30 minutes. The bidder will certify that a substantially similar cab has been tested and has met these criteria.

AMP DRAW REPORT

The bidder will provide, at the time of bid and delivery, an itemized print out of the expected amp draw of the entire vehicle's electrical system.

The manufacturer of the apparatus will provide the following:

- Documentation of the electrical system performance tests.
- A written load analysis, which will include the following:
 - The nameplate rating of the alternator.
 - The alternator rating under the conditions specified per:
 - Applicable NFPA 1901 or 1906 (Current Edition).
 - The minimum continuous load of each component that is specified per:
 - Applicable NFPA 1901 or 1906 (Current Edition).
 - Additional loads that, when added to the minimum continuous load, determine the total connected load.
 - Each individual intermittent load.

All of the above listed items will be provided by the bidder per the applicable NFPA 1901 or 1906 (Current Edition).

ADDITIONAL EQUIPMENT ALTERNATE # 1

Qty	Description	Unit Cost	Total Cost
2	Elkhart Model #B-375-GA, 1-1/2" ball shutoff and pistol grips (1) Red / (1) uncolored. The lightweight, Elk-O-Lite shutoff shall have a Tab shaped handle with double stops that controls a UHMWPE seat with a full round metal ball. The shutoff shall have a 1-1/2" NH free swivel base with a 1-1/2" NH male outlet and a 1-3/8" waterway.		
2	Elkhart Model #281A, Mini Stream Shapers shall be provided. This stream shaper shall be used in conjunction with an Elkhart smooth bore tip. The tip shall be of Elk-O-Lite construction with a 1-1/2" NH female inlet and 1-1/2" NH male outlet with replaceable acetyl vanes.		
1	Elkhart Model #B-375-GA, 2-1/2" ball shutoff and pistol grips shall be provided NH free swivel base with a 1-1/2" NH male outlet and a Quarter turn, ball valve, hand line shutoff with 1.375" waterway; it shall be constructed of durable, hard anodized, lightweight Elk-O-Lite; shall have rugged aluminum bronze horseshoe handle with double stops; shall have a double actuating full round metal ball shutoff with a UHMWPE seat; The shutoff shall have an integral smooth bore tip size 1 1/4" machined into the outlet of the shutoff body; The shutoff shall have an Elk-O-Lite pistol grip handle. The shutoff shall have a 2.5" female threaded Miami Dade Style swivel inlet and 1.5" threaded male outlet		
1	Elkhart mini stream shaper shall have a replaceable Acetal vane with a 2.5" female inlet and 2.5" male outlet. The length of the stream shaper shall be 2.50" with a weight of 2.50 lb.		
1	Elkhart model B-100-A gated wye 2-1/2" NST F X (2) 1-1/2" NST M		
1	Elkhart model B-97-A, gated wye, 2-1/2" F.NST x (2) 2-1/2" M. NST		
2	2550-V18BL08ACSP Supervac Positive Pressure vans 9,600cfm		
2	Elkhart 2-1/2" X86A, hydrant gate valves		
6	2-1/2" chrome plated #653 tri-loc mounting plates. South Park Crome		

ADDITIONAL EQUIPMENT ALTERNATE # 1 CONTINUED

2	Milwaukee 2366-20 M18 ROVER Compact Lithium-Ion Dual Power 4000 Lumens Corded/ Cordless LED Flood Lights		
1	Kocheck 5" Storz x 2 1/2" NH Female 3-Way Siamese-Clappered 30K0525		
1	Knox Keysecure box		
7	Gemtor Poppier Ladder belts (1) S (2) M (2) LG (2) XL		
1	Kocheck 12K45205 hydrant gate valve 4.5 NH SW RL F X 5 STORZ		
1	ES-100-28D Rescue Spreader		
1	ESLC-29D Rescue Cutter		